NEW ZEALAND JOURNAL OF
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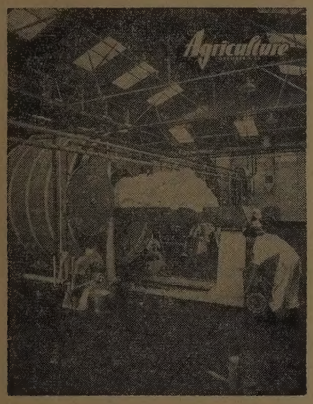
Volume 95
Number 5
15 November
1957
(Established 1910)

NEW ZEALAND JOURNAL OF Agriculture

Published by
Direction
of
Hon. S. W. Smith,
Minister of Agriculture

This Month's Cover



Butter being removed from a churn on to a stainless steel tray in the new Tai Tapu dairy factory at Addington, Christchurch. The churns, the largest of their type in the world, produce 2½ tons of butter at a time. The Tai Tapu dairy factory, registered in 1888, is among the earliest co-operative companies still in existence. The new factory, opened in August 1955, has many new features in its design and layout. As much as possible of the equipment is of stainless steel, the floors are tiled, and there is controlled ventilation throughout the factory. Photograph by R. V. Francis Smith.

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SUBSCRIPTION RATES

The "Journal" is issued monthly. The subscription within New Zealand is 10s. a year; the overseas subscription is 13s. (sterling). The "Journal" may be ordered from any bookseller or newsagent or direct from any office of the Department of Agriculture. Individual copies are available from Publications Section, P.O. Box 2298, Wellington, at 1s. a copy, post free.

Subscribers' inquiries (preferably accompanied by the address cut from a recent "Journal" wrapper) should be sent to the nearest office of the Department of Agriculture.

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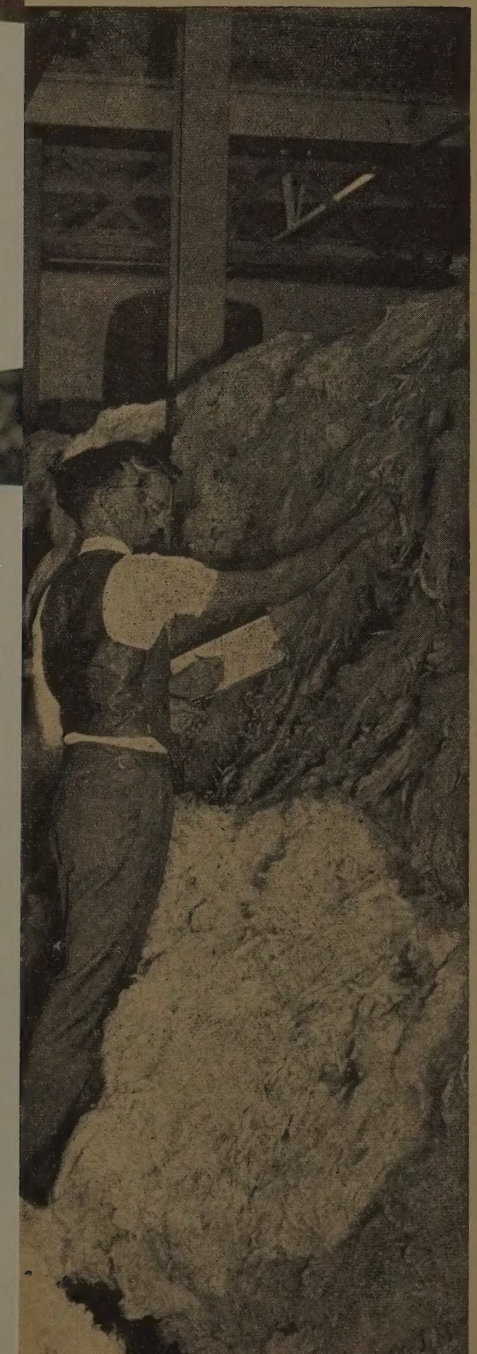
REGISTERED AT THE G.P.O., WELLINGTON, AS A MAGAZINE.

The *Other Man's* Point of View on Wool

Some Things Wool Buyers Take into Account

By J. E. DUNCAN,

Wool Supervisor, Department of Agriculture, Wellington



IT is substantially true to say that practically all wool grown is used; very little is wasted. Much of it is used over and over again, and many New Zealanders do not realise that in Britain, for example, there is a large and thriving section of the manufacturing industry which uses very little virgin wool, but depends in the main on recovered wool from various sources. Burning an old jersey or working trousers—not unknown here—would be regarded in Dewsbury as sacrilege. One manufacturer has expressed the opinion that a single wool fibre may serve mankind for a century; another that it could still be used as long as it had two ends.

WOOL growers have frequently asked, "What is the ideal wool? Tell us what the buyer wants and we will try to grow it". Unfortunately it is not nearly as simple as this. Every kind and type of wool can be used in some section of the vast manufacturing industry. Wool which is readily snapped up by one buyer is of no interest to another. For this reason it may be misleading for a farmer to ask the opinion of one or two buyers about his wool. These men may be specialising in a narrow section of the trade, and with the best will in the world, their advice may be biased toward their own requirements.

If the farmer could take a cross-section of the opinions of several dozen buyers he would be on safer ground, but as this is impracticable, he would do better to ask his broker. The wool broker has the requisite expert knowledge, and as it is in his interests, as well as those of his client, that the wool should fetch the maximum price, he will give the farmer all the help he can. Unfortunately too many farmers do not ask their brokers and too many brokers are inclined to avoid or tone down criticism of the farmer's clip for fear of offending him and possibly losing a valued client.

The Sheep and Wool Instructors of the Department of Agriculture are also qualified to advise on wool production and preparation for market, and they are in a position to give unbiased advice on wool, as they are completely disinterested parties financially.

For many years now this small team of instructors has been encouraging in a practical way the growing of more and better wool and its more thorough preparation for market. This has been done by individual farm visits, by lectures, field days, farm schools, broadcasts, and any other means at their disposal. Latterly they have joined forces with the Wool Board's shearing instructors and Federated Farmers to put on specially organised wool-handling demonstrations at woolsheds throughout the country.

These demonstrations have been well attended and the demand is for more of them, to the limit of the capacity of a very limited staff. At these demonstrations Sheep and Wool Instructors deal with the fundamentals of wool handling and give and demonstrate fully their reasons for doing certain things and not doing others. For the benefit of those who are unable to attend and to amplify the subject for those who do, it is proposed here to set down more fully what the buyer looks for in wool. It should be emphasised again, however, that there are exceptions to almost every rule in the wool business, mainly because of its vast ramifications, and the most that the writer will attempt is to give a general guide to the wool producer.

THE FARMER'S VIEWPOINT

The farmer knows only too well the difficulties involved in growing sound, attractive fleeces on his sheep. The synthetic fibre manufacturer has all his raw material and machinery under close control and can vary the quantity and quality of his output at will. To grow a perfect staple of wool is a much more difficult and chancy business; there are too many uncontrollable factors continu-

← Buyers inspecting wool displayed in a store before auction.

ally tending to damage or spoil it in some way.

Some firms producing stock remedies and allied products frequently make claims that such and such improves wool. Nothing encountered or likely to be encountered by the farmer can improve wool, though plenty of things can damage it in various ways. The fact is, and this cannot be too strongly emphasised, that the wool on a sheep is a dead substance.

The only stage at which wool could truly be said to be alive is while it is being produced in the plastic state within the wool follicle buried in the lower layers of the sheep's skin. By the time it reaches the surface of the skin it is hardened into its final form. The only improving that can be done is to the portions of the fibre yet to be grown. If the sheep are well fed and run under favourable conditions, the wool has every chance of being sound and attractive, provided, of course, that the sheep are well bred.

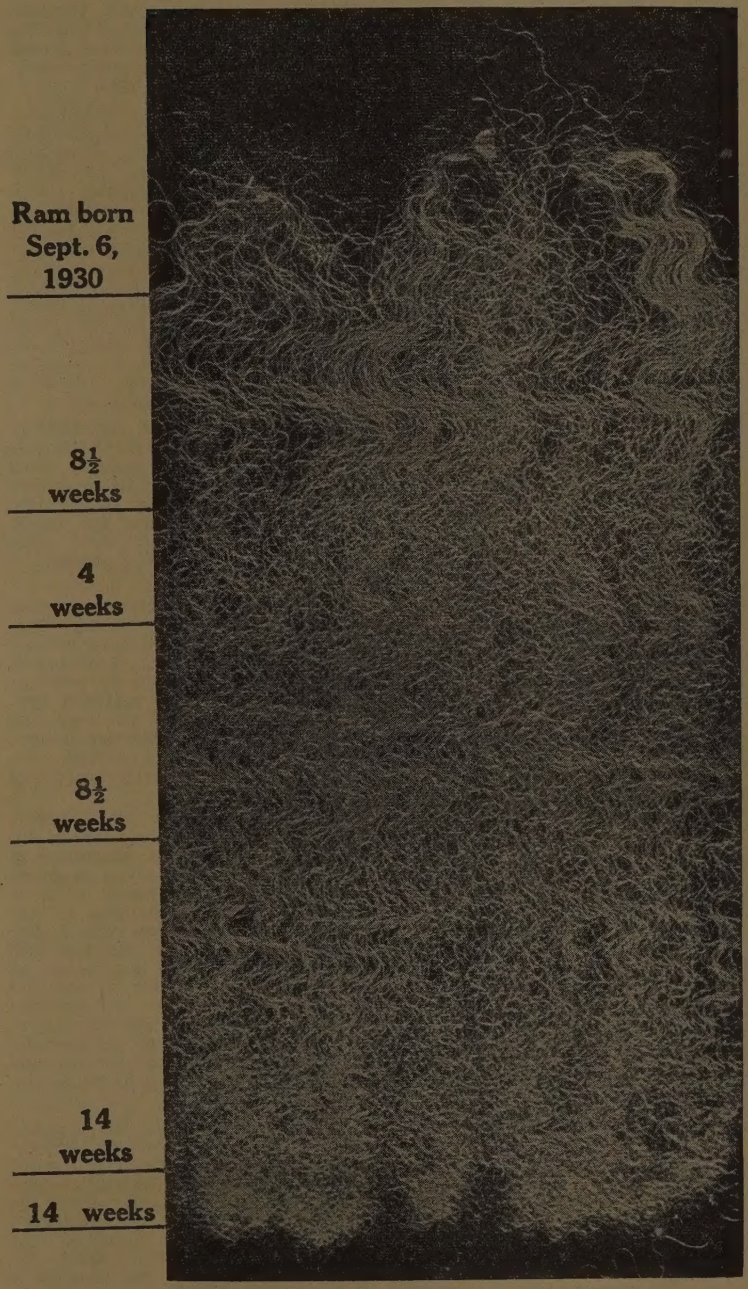
Unlike many of the fibres which grow on animals the wool which grows on modern breeds of sheep is not shed at regular intervals; it goes on growing indefinitely. In a trial in South Africa with a few Merino wethers some of them grew wool for as long as 13 years and until the wool had to be pinned up on their backs to keep it from dragging on the ground.

THIS article on the characteristics of wool and how they are taken into account by those who buy it for various manufacturers will be concluded in next month's "Journal" with a discussion of hereditary and acquired faults.

For a long time it was thought that under favourable conditions of feeding wool grew uniformly throughout the year. Feeding certainly is one of the most important factors in growing wool, and the stronger-woolled breeds, such as the Romney, seem to be particularly susceptible to setbacks because of unsatisfactory feeding; much more so, for example, than a hardy breed like the Merino. A Romney will not produce a heavy, stylish, fault-free fleece unless it is well fed throughout the year. An Australian Merino can survive a drought and still produce a comparatively attractive fleece, even though it may be light in weight and finer in the fibre than normal.

Effect of Feeding on Wool

In several carefully controlled experiments carried out a number of years ago at Canterbury Agricultural College, Lincoln, it was shown that sheep fed for a year on a high plane of nutrition produced three times the weight of wool grown by similar sheep kept for 6 months on low-plane feeding and 6 months on maintenance



The time scale on the left shows how much this wool grew in a given time. Under unfavourable feed and weather conditions during the last 14 weeks the wool grew only a sixth as fast as it did during the previous 14 weeks. (From work done by R. Waters at Massey Agricultural College.)

rations. For Corriedales the fleece weights were 18lb. and 5.8lb. respectively, and for Romneys 15.6lb. and 5.2lb. Poorly fed Corriedales produced fleeces which were still good to excellent in character despite their light weight, but poorly fed Romneys gave fleeces lacking in character and inclined to be tippy.

In the final analysis most farmers are mainly interested in the weight of wool produced per acre. Fibre diameter, length, character, yield, and the like are very much secondary considerations to many farmers. They know that weight is what fills the bales and ultimately their pockets. This is substantially true, particularly with Romney sheep and in recent times. However, for all our farmers to adopt this attitude would be very short-sighted, and the rest of this article attempts to show why.

THE MANUFACTURER'S ANGLE

In the last 20 years or so, and particularly since the war, a great deal has been heard about new synthetic "miracle" fibres. There has been a vast amount of costly, high-pressure advertising of these, particularly in America, and some of it has backfired rather badly because the miracle did not happen and the new fibre was found to fall far short of the claims made for it.

To begin with these claims usually implied that wool was more or less obsolete and that the new fibre could outshine and outperform such a lowly excretion of the humble sheep on every count. Latterly the synthetics have been reluctantly admitting that a little judicious blending in of wool might be a good thing after all. The scientists engaged on wool research are quietly pointing out that wool is the real miracle fibre, possessing a combination of virtues not yet approached, let alone equalled, by any man-made fibre.

It is well known that wool has some drawbacks, such as its tendency to shrink or to provide a meal for a moth grub, but manufacturers now have the knowledge to overcome these defects. The scientists have gone further and shown how wool can be improved by certain treatments, but not on the sheep's back. It can be made smoother and non-tickling for underclothes and water repellant for outer garments. It can be dyed in new and attractive shades never matched by its rivals and made tougher and harder wearing by other treatments. A long list of scientific achievements could be quoted and more are on the way.

However, to give a fairly balanced picture it must be admitted that the synthetic fibre interests are doing even more research, much more proportionately than the wool industry.

United States synthetic fibre manufacturers are spending approximately 50 million dollars per year on research and developmental work. The whole of the wool industry probably spends less than £1 million (2¾ million dollars) per year on research work. Various synthetic fibres have individually surpassed wool in nearly every property one could mention, such as fineness, length, strength, durability, whiteness, uniformity, and last, but not least, ready availability and stability of price over long periods.

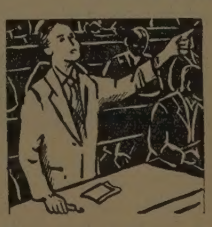
Ever-diminishing Margin

No single fibre has yet combined all the virtues of wool, but this holds true by an ever-diminishing margin. Wool cannot afford to rest on its reputation or on the advertising slogan that "There is no substitute for wool". Some day there may be if wool stands still and does not harness research to the utmost.

The textile manufacturer's function is to fashion fibres into fabrics. Generally mill owners need have no particular loyalty to wool. Undoubtedly there is some sentiment in business, and some firms would prefer to continue to manufacture all wool and 54in. wide, but if synthetics become almost as good and a lot cheaper, mills will be more than strongly tempted to use them.

It seems that in the future textile mills will "engineer" their fabrics, including the kinds and quantities of fibres required for a given performance in the finished fabric. This is already beginning to happen, for example in men's socks, where frequently some nylon is blended with the wool throughout the sock, and extra nylon is included at toe and heel to withstand the concentrated wear at these points. However, more than half the weight of the sock remains as wool where warmth and comfort are considered to be as important as durability.

THE WOOL BUYER'S OUTLOOK



The wool buyer is usually either the manufacturer's employee or his agent, and his function is to procure the right kinds of wool at the most favourable prices; that is, the lowest possible prices for the mill. That his task is complex and difficult is immediately apparent when it is remembered that during the war under the official appraisal system nearly 1000 individual types of greasy wool were listed, not counting 460 odd types of skin wool from the freezing works.

To the uninitiated one bale or bin of wool looks much like another, but a quick glance will tell the buyer a great deal. Give him a minute or even less for a closer look and an opportunity to handle the wool and he will be in a position to name his price. To arrive at this his mind must consciously and unconsciously juggle a whole array of characteristics of that particular wool and translate them into current value on an ever-fluctuating market.

Further, unless his calculations are pretty accurate most of the time, he will not remain a wool buyer for long. If he is too cautious, he will be consistently outbid by his competitors at auction and buy no wool. If he is too optimistic in his valuations, he will buy the wool, but probably at a loss to his principals, who will give him few warnings before replacing him. It is no wonder, therefore, that many years of experience must be gained before a buyer reaches the top of his profession and that when he does he is well paid for his skill and his heavy responsibility.

Safeguard for Wool Producer

The auction system operated in New Zealand is an excellent safeguard for the wool producer. There is world-wide competition for his wool and with rare exceptions he gets full market value for it on the day. That is why correct preparation of the clip is so important. Mixed lines of wool have little appeal except to speculators, who make a living by buying them at a discount, sorting them, and reselling at a profit. To take an analogy, a hardware firm who were sent a mixed consignment of bolts and nuts of various lengths, diameters, threads, and head shapes all heaped together indiscriminately in one box would have plenty of cause for complaint. Such a thing just would not happen in the engineering industry, but its equivalent happens every day with wool. It does not happen with synthetic fibres, where a batch can be bought on exact specifications and a repeat order will be identical in every respect.

It is impossible to achieve this degree of uniformity in wool from any flock, but there is plenty of opportunity for improvement before the wool is offered for sale. Before considering what can be done by the grower or the broker, however, it is necessary to understand what influence the various characteristics of wool have on its market value. There are certain ones which are in strong demand; for example, extra long wool is scarce today and provided it is right

in other respects, it will command a premium. Stained wool is not wanted by a majority of buyers and so is worth less.

FLEECE CHARACTERISTICS

Fineness

The old saying that "it takes fine wools to make fine fabrics" is still sufficiently true to make fineness, or in other words fibre diameter, one of the most important considerations in valuing wool. In general, the rule over the years has been that the finer the fibre the higher the price. There have been short-term fluctuations due to special circumstances, such as wars, when crossbred wool has approached the price of Merino, but most buyers still consider the fineness or "Count" or "Quality Number" of the wool first.

It is necessary to digress to explain these terms. Originally the count or quality number was defined as "the number of hanks of yarn, each measuring 560yds., which could be spun from 1lb. of tops". (Tops is semi-manufactured wool which has been washed and combed.) But more than simply fibre diameter will influence the length of yarn which can be spun. The length of the fibres and other factors also play a part. In practice, only with the finer wools could, say, 70 hanks of yarn **actually be spun** from 1lb. of 70's Merino tops. With crossbred wools the figure is likely to be much lower than the actual count; for example, probably only about 32 hanks of yarn could be spun from 1lb. of 50's Romney tops. (The trade would not refer to it as Romney, but merely as crossbred.)

The buyer, of course, is valuing greasy wool and not tops, so this estimate of number of hanks of yarn is many stages removed from what he is looking at. Over the years count or quality number or just plain "Quality" has come to mean in practice an assessment of average fibre diameter. It is true that this assessment can be either consciously or subconsciously influenced up or down by other factors such as crimp, length, style, or lustre, but in the main fibre diameter is the factor that counts.

There is a close relationship between average fibre diameter and crimp; that is, the waviness of the staple of wool. There are notable exceptions which tend to be very misleading at times, but in general the finer the fibre the finer the crimp. Attempts have been made over the years to draw up tables to relate counts to fibre diameter (expressed in fractions of an inch or millimetre) and also to crimps per inch. These have never been widely accepted by the trade, partly because the authorities who drew up the tables could not altogether agree among themselves, but mainly because wool buyers like to be independent and able to back their own judgment.

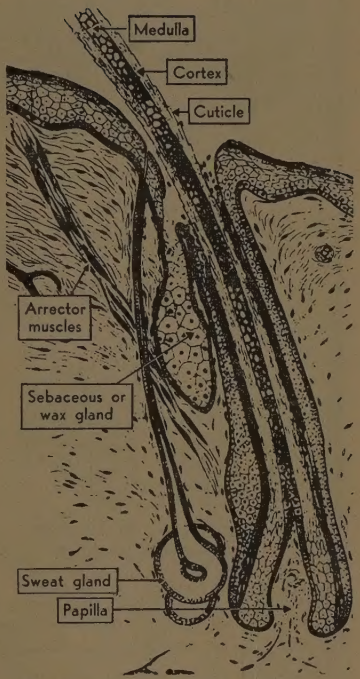
Some years ago the Department of Agriculture, with the close co-operation of the appraisers of the New Zealand Wool Disposal Commission, made up sets of count standards. These were typical samples of wool representing straight counts ranging from 36's to 70's enclosed in sealed glass-fronted metal boxes. They met a ready demand and the 100 sets made up were quickly sold to wool brokers, scouring works, and educational institutions. There they have served a useful purpose as a sort of yardstick to resolve arguments, because even though many people today may not agree fully with the counts marked on the samples, at least these standard samples are consistent from Auckland to Invercargill and serve, as it was intended they should, for reference purposes. After all it does not matter a great deal if one man calls a wool a 48's and another says it is a 48/50's as long as they both do so consistently and do not waver from time to time in their estimates.

It is not necessary for the average farmer to have a close knowledge of wool counts if he concedes the necessity to keep dissimilar wools separate. If he is content to let his broker separate his stronger and finer fleeces by classing or binning, he has passed the responsibility to an expert, but if he intends to do the job himself, he should be able to distinguish between the principal wide grades. Official sale reports in the newspapers nominate wool by grades based on count and the following are excerpts from two sale reports from Christchurch and Wellington during 1957.

Merino, 60/64's
Extra fine halfbred and Corriedale, 58's and 58/60's
Fine halfbred and Corriedale, 56/58's
Medium halfbred and Corriedale, 56's
Halfbred and Corriedale, 50/56's
Extra fine crossbred, 52's and 50/56's
Fine crossbred, 50's
Medium crossbred, 48/50's
Crossbred, 46/50's
Coarse crossbred, 48's and 46/48's

It will be noticed that straight counts are the exception, for the good reason that even a large wool store handling thousands of fleeces in its binning operations still often finds it expedient to combine two or even more counts in a single bin; for example, 46/48's or even 46/50's with certain wools. They would not, however, make a bin for 46/56's fleece wool. The range here would be too wide and most buyers would shy clear of a mixture like this.

The argument may well be raised that manufacturers sometimes deliberately blend rather dissimilar wools. For specific purposes they do, just as the housewife does with flour, eggs, raisins, and other ingredients to make a cake, but she likes to buy these separately first.



This diagram shows a typical cross-section through a wool follicle, embedded in the deeper layers of the skin. The follicle is the fibre "factory", and the keratin from which the fibre is made is secreted by the papilla, which has a copious blood supply.

A helpful analogy. A wool fibre has a similar arrangement of layers to those of a tree.

Well-classed wools interest a wider range of buyers and therefore meet with better competition than mixed lines. Again this is a general rule only, and one always hears of the exception of Bill Smith who did not have his clip classed getting as much as

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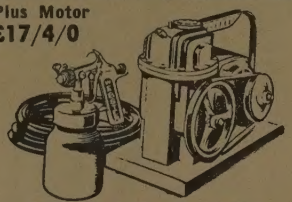

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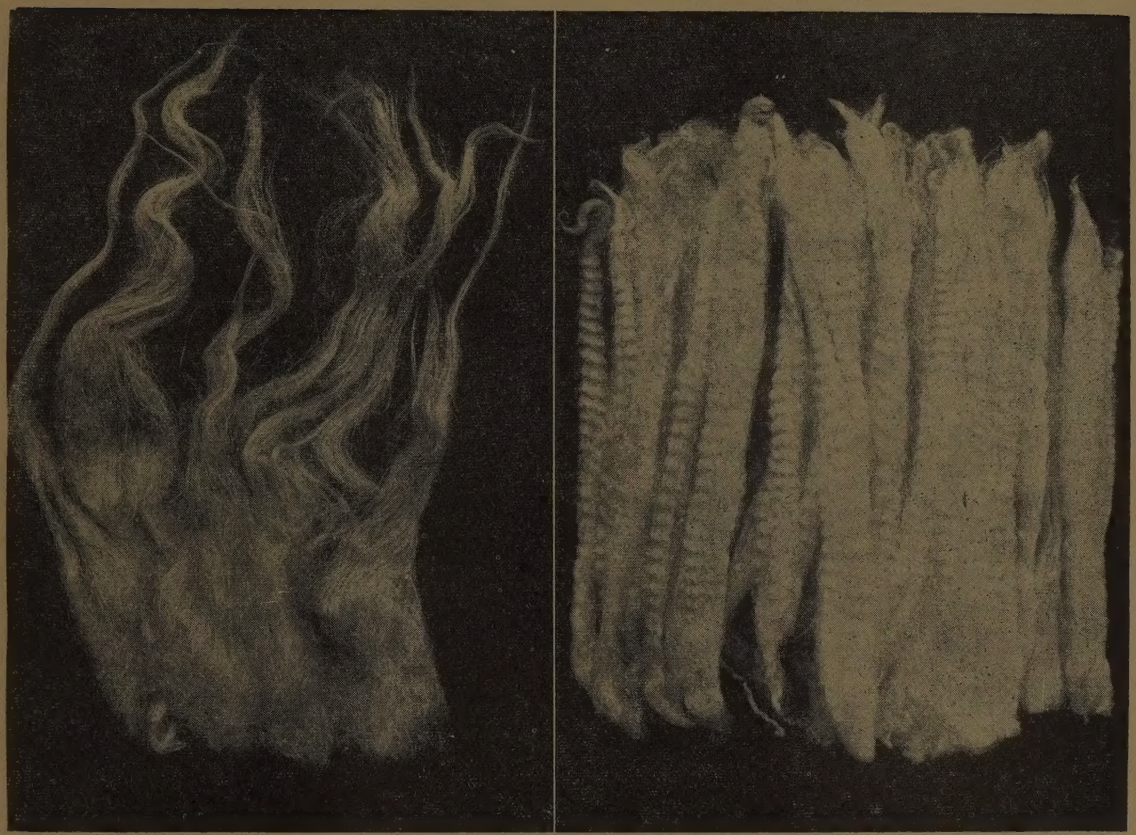


Two extremes in wool. Inferior crossbred wool (left) that is very tippy, hairy, and plain contrasted with good Romney wool (right) having excellent style and character.

Bert Jones who did. No doubt this happens quite frequently, but there is always a logical explanation for it which will become clearer presently. The main thing to remember is not to mix coarse and fine wools and this applies to skirtings as well as fleece wools. Do not mix, for example, first pieces with coarse, hairy britch pieces. The latter may be keenly sought by the carpet manufacturer, who will pay a good price, but the same buyer will not want fine and coarse mixed; nor will the woollen section. It will have been spoilt for both of them.

Length

Length of fibre plays a big part in determining the suitability of wool for a particular purpose. The trade has always separated wools on a length basis, and now that long crossbreds are so scarce it is willing to pay a premium for them. The basic reason for sorting wool on length is that much of the machinery in the mill can handle efficiently only a limited range of fibre lengths. It can be adjusted to deal with other ranges, but such a change is not easily or quickly made and therefore the practical solution is to sort the wool beforehand on a length basis rather than attempt to make frequent adjustments to the machinery.

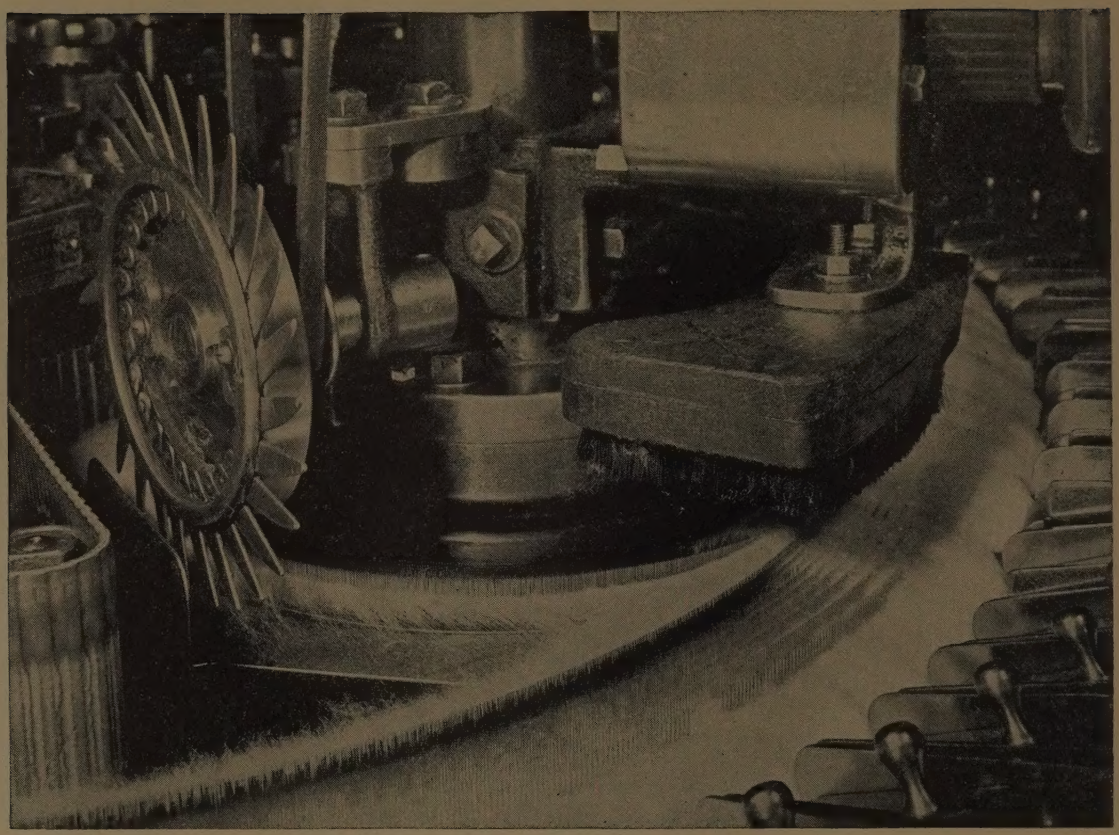
Several terms are used in the trade to denote length, such as "Preparing", "Paper Felt", "Carding", and sometimes "Clothing" for crossbreds; and "Warp", "Half Warp", "Spinner's", "Combing", and "Clothing" for the finer wools. The term "Second-shear" also carries an implication that the wool will be abnormally short because the sheep have been shorn twice in one year.

Some textbooks give tables of length which draw clear-cut lines between the different terms; for example, with a 46's crossbred anything below 7in. is called a carding wool and anything over this length is stated to be a preparing type. Unfortunately it is easy but incorrect to lay down hard-and-fast limits of length for each description, because buyers themselves vary in their use of these terms according to their nationality, the purpose for which they require the wool, the machinery to handle it, and other factors.

The wool manufacturing industry can be divided broadly into several major sections:—

The worsted section has the distinguishing feature that all the wool it handles is combed. After the preliminary scouring to remove grease and dirt the wool is treated in either of the following ways: If it is below a certain length for its count, it undergoes carding on a carding machine; if it is above this length for count, it goes through the preparing process on special gill-boxes before the combing stage; hence the descriptions carding and preparing.

The combing process removes the short fibres as "noils" and lays the longer ones parallel in the form of a



Close-up of a "Noble" comb. Where the two circles of pins diverge the combing action takes place. Combing lays the longer fibres parallel, ready to make them into tops. The shorter and broken fibres are extracted on the small circle as noils.

"sliver". Several slivers are combined to form a ball of "tops". After numerous other processes the tops are spun into worsted yarns, the distinguishing feature of which is that because most of the fibres lie parallel the yarns are strong and relatively smooth. They are therefore suitable for making all the high-quality materials such as worsted suitings, gabardines, and certain knitted goods such as underclothes, which require good strength, durability, and smooth finish and which frequently incorporate a fine, well-defined pattern. This section is not generally interested in short, inferior, or tender wools, because they are unsuitable for combing.

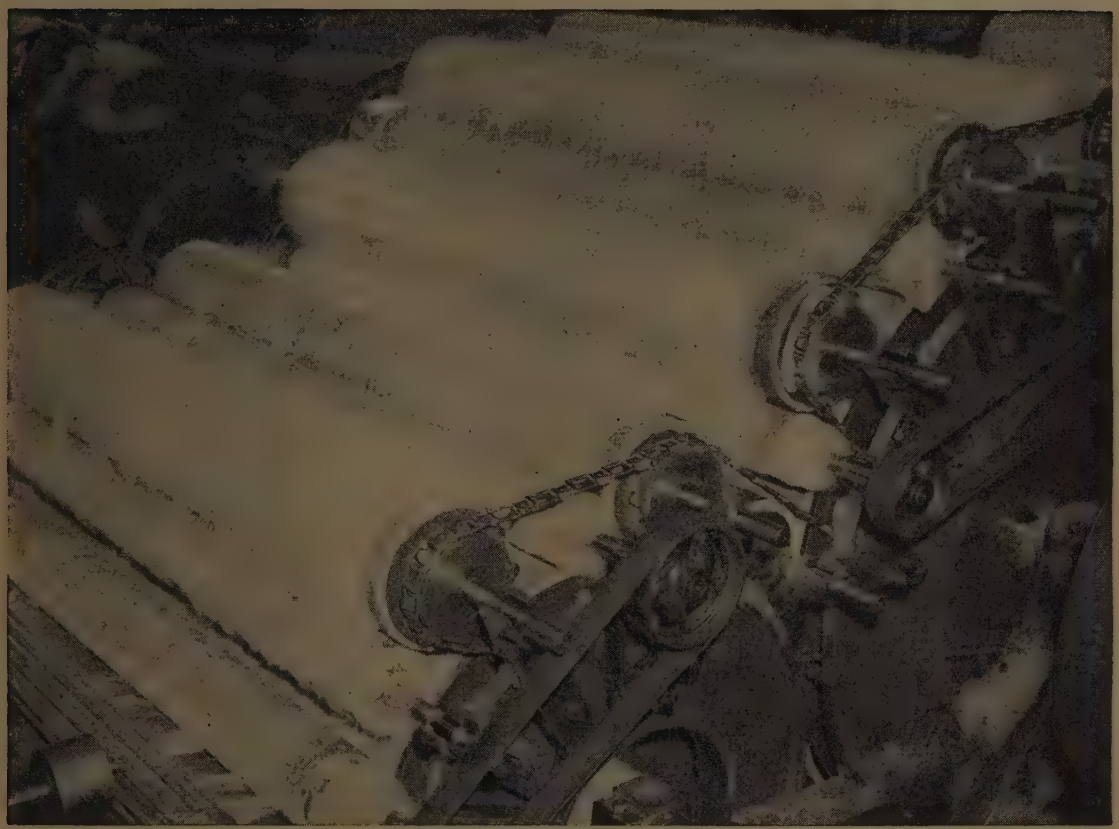
The woollen section does not comb its wools and puts them through a smaller number of processes before spinning. In fact the wool is spun directly after carding, though the carding machines are slightly different from those used by the worsted manufacturers. The wools used by this section are frequently known as "Clothing" types and generally are shorter than those used by the worsted mills.

Because it has not been combed, the yarn made from them is fuller, softer, and fluffier than a worsted yarn and usually not as even or as strong. It is used for making a multitude of fabrics ranging all the way from high-class billiard cloths, tweeds, and flannels down to the cheapest grade blankets and overcoatings. The high-class end of this section requires sound, attractive wools of reasonable length, but at the lower end short, inferior, and tender wools and a large bulk of reworked wool, and even cotton and artificial fibres, can all be skilfully blended in to produce quite a presentable cloth showing on the surface little trace of its hybrid ancestry.

Incidentally the woollen section uses the noils separated by the combs of the worsted section. Patterns are generally broad and not so clearly defined as with worsteds and the cloth is often said to be "made in the finishing", much care and skill being applied to produce the required surface texture by special treatments.

The felt and mechanical section produces chiefly a multitude of different types of felt with as many uses, one special branch being devoted entirely to making the specially strong woven felts used in the paper-making industry (paper felts). This section also produces the roller lappings used in the wool industry itself for covering the surface of the heavily loaded squeeze rollers in wool scouring machines.

Felt makers have special requirements and are interested in a wide range of wools. To take a single example, a felt floor covering may be made partly from crossbred wool for strength and to keep down the price, but it may be faced on one or both sides with Merino to give an attractive, soft finish. Engineering felts for



The carding process shown here breaks up the staple formation, opening up the fibres into a thin web or film. It also removes a certain amount of vegetable matter. The work is done by the thousands of wires of the "card clothing" with which the revolving cylinders are covered.

gaskets, filters, and polishing bobs require quite different sorts of wool and treatment from that of felts for slippers, hats, floor coverings, etc.

Because of the wear and tear and mechanical strains to which they are subjected paper felts are made from superior wools. Generally they must be long, absolutely sound, of good style and character, and usually of a good colour. In recent years brokers have been paying more attention to making paper felt lines because on account of their scarcity they fetch a good premium. Farmers preparing their own clips will find it worth while to separate fleeces of paper felt description and send them in for binning, unless they have enough for a 4-bale or larger line.

The carpet section: This group is generally interested in the coarse and frequently hairy types of wool. Because length is a secondary consideration in the wool that carpet manufacturers are able to buy in New Zealand, they are keen to buy large quantities of crossbred crutchings. There seems to be less and less fleece wool coarse enough to meet their requirements.

The terms spinner's, warp, and half warp are applied to Merino wools and indicate superior types long enough for combing, usually more than 2½in. to 3in. long, according to the term used and who uses it. An added complication is that the term combing is also used for wools from about 1½in. to 2½in. long.

The minimum length capable of being combed depends on the kind of comb used, Continental mills being able to comb shorter wools than most of the British manufacturers. "Clothing" wools will therefore usually be below 1½in. long. The term clothing is also sometimes applied to halfbred and crossbred wools and will mean wool below 1½in. for halfbreds and 3in. for crossbreds, these figures again being only approximate and varying with the buyer and the end product. It is probably quite safe to state that most "clothing" wools are used in the woollen section, a small amount for felts, and none for worsteds.

Yield

The wool buyer probably exercises his greatest skill when he assesses clean, scoured yield. Here there is no substitute for human skill and experience. As the yield of the wool is something the farmer cannot see, as he can with, say, length or colour, he is apt to overlook the big part it plays in determining the price his wool will bring. The manufacturer needs clean wool fibres to make his fabrics and the admixture of grease, dirt, dust, seeds, and so on found in the average fleece represents impurities to be got rid of and to be taken into account when the price is fixed.

Actually nearly all transactions are based on "clean prices", and the "greasy price" is derived from the clean price by assessing yield as a

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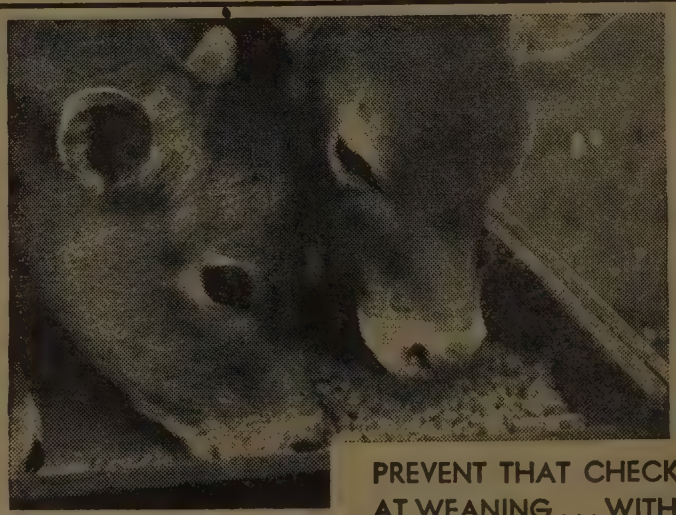

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percentage and discounting the clean price accordingly. To take a simplified example: Suppose the clean price of a given wool type is 100d. and the yield is 75 per cent., the greasy price = clean price $\times \frac{\text{yield}}{100}$, that is,

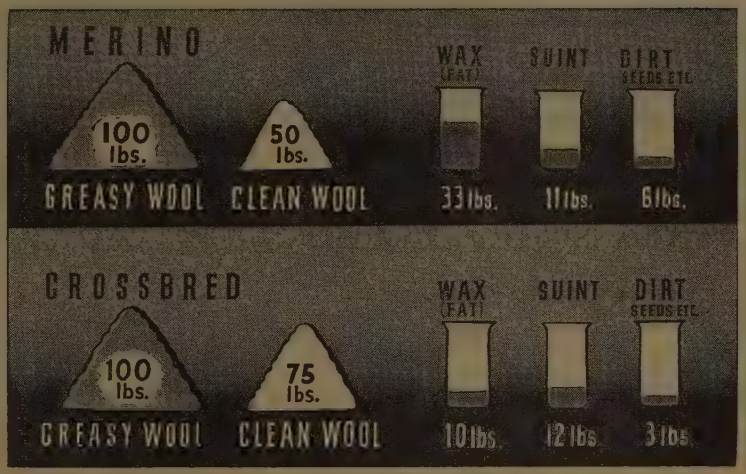
$$100 \times \frac{75}{100} = 75\text{d.}$$

The clean yields of New Zealand wools vary considerably according to breed, locality, season, and other factors. Again to illustrate by example: A Romney fleece from Wanganui might average 75 per cent. clean, scoured yield; another from Westland might yield over 80 per cent., owing to the high rainfall having practically washed the wool on the sheep's back. Another Romney fleece from the Manawatu where the sheep had been run on heavy land and particularly well fed might yield only 70 per cent. because of the extra grease in the wool. Another from the coastal area near Foxton might be carrying a load of heavy black ironsand and the yield could easily be as low as 60 per cent. or even less. On the hypothetical clean price of 100d. the greasy prices of these four wools would be 75d., 80d., 70d., and 60d. Based on actual 1956-57 season prices, they would be 56¼d., 60d., 52½d., and 45d. So it can be seen what a difference yield alone can make to the price bid at auction. Of course other factors are inseparably mixed with yield; for example, the fleece from Westland might be badly water stained and the one from Wanganui might have a bad break, both of which would pull down the price.

Different portions of the fleece vary considerably in yield; thus the necks are often high yielding while the bellies are heavy in grease and often plastered with mud, so that their yield is a good deal lower than the fleece average. Seed, such as bidi-bidi, may be confined to the belly and points (extremities) of the fleece, or it may be spread over most of it. Some buyers do not want seedy wool at any price; others will take it at an appropriate discount for mills that have the plant necessary for its removal. If a clip is heavy in seed, there is not much that can be done about it. If it is confined to the points, these can and should be skirted off, leaving the fleece lines free. If only a few sheep are carrying seed, the seedy skirtings should always be segregated from the free ones. Mixing seedy and free pieces will bring the value of the whole lot down. A little extra care here can pay good dividends.

Yield is not quite as simple as described. Buyers often work on "top and noil" yields; that is, they assess how many pounds of tops and noils they expect to get from 100lb. of greasy wool and this is not the same thing as clean, scoured yield, because mill wastage is taken into account.

BUYER'S POINT OF VIEW ON WOOL



The clean yields of New Zealand wools vary considerably according to breed of sheep, locality, season, and other factors. Examples of yields from 100lb. of two types of wool are shown.

However, the general principle and the important bearing yield has on auction price should be clear.

The terms "greasy" or "grease" are frequently applied to wool, but technically are inaccurate. The yolk in sheep's wool contains no real grease or oil; it is actually a blend of two components, suint and wax. The suint is the dried secretion from the sweat glands and is water soluble, being rich in potash salts. The wax is a complex substance secreted by the sebaceous glands of the skin. It is not soluble in cold water, but can be emulsified and removed from the fibre by hot water and soap or a synthetic detergent. Several wool scourers in New Zealand have installed plant for recovering the wax in the form of crude lanolin. Refined lanolin is the basis of many cosmetics and pharmaceutical preparations such as ointments and even synthetic hormones. In a less refined form it is used for a multitude of purposes, such as rust preventives, leather dressings, printer's ink, and wool-branding fluids.

Soundness

If a staple of wool shows a localised weak spot, the defect is known as a "break". This is a serious fault and many buyers cannot bid for wool of this type, as it is quite unsuitable for their purposes. For example, combing wools must be sound to stand the strain of combing. If they were not, many fibres would be broken and go out with the less valuable noils. A long wool can never qualify as a paper felt unless it is completely sound.

In some of the older textbooks will be found a statement that combing wools must stand a strain of 7lb. This is completely meaningless without a definition of how the strain is to be applied and to how many individual fibres. An average single lock or staple of sound wool is so strong that no ordinary man could break it by holding the ends tightly in either hand and tugging with all his might. This is not surprising, as a sound fibre of wool has a tensile strength equal to a gold wire of the same diameter.

A break or localised weak spot is caused by some severe setback the sheep has received, such as sickness or starvation. Lambing very frequently causes a break in ewe wool. This can be avoided by pre-lambing shearing, because then the staple is cut off practically at the break. The nearer to the middle of the staple the break or breaks are, the more detrimental their effects on the staple's suitability for textile manufacture. The approximate time of year when the setback took place can be deduced from the position of the break along the length of the staple.

Wool which is weak throughout the whole length of the staple or even most of it is termed "tender". Its value will be discounted according to the degree of tenderness and the number of buyers who are interested in bidding for wool of this kind. Such wools can be used by the woollen section of the industry, but they will have to be blended with sounder fibres to make acceptable yarns.

The wool grower should deal with tender wool in a similar way to seedy wool. If the whole clip shows a break or tenderness, nothing can be done. If a fair proportion of fleeces show this defect, a separate line should be made;

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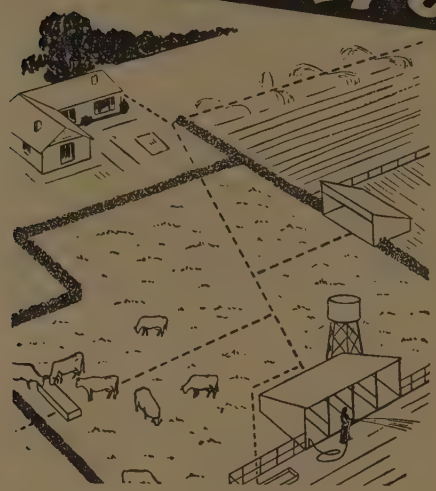

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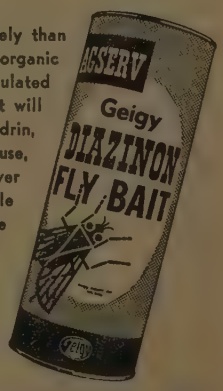

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if only a few are affected, they should be sent to the broker for binning.

Style

A number of terms are used in the wool trade which are ordinary words endowed with special meanings and these can be very confusing at times to the uninitiated. The special meaning of "quality", really indicating average fibre diameter, has already been mentioned. Because "quality" was already earmarked for another use, it could not be used to describe the relative superiority of different lots of wool, so the word "style" is used instead.

Style is not easy to define accurately because the weight it carries varies in different sections of the trade. Once again an example will serve best: During the war, when the whole of New Zealand's wool was commandeered under the appraisal system, an official bareme or type list was drawn up which standardised the descriptions of the many types of New Zealand wools and allocated a number to each. The wools were listed in grades according to count, beginning with the finest wools and working down to the coarsest. Superimposed on this was grading according to length, and each grade was also subdivided according to style. On top of all this, yield was taken into account in arriving at the final greasy price.

The definition of style was set out according to seven grades given below. In the main the trade has adhered to these in the post-war years with slight modifications; for example, the AA and to a less extent the E styles have been dropped, as so little wool falls into these categories, and some brokers have introduced an intermediate B/C style for borderline cases.

DESCRIPTION OF STYLES FOR FLEECE WOOL

Super—AA: Good colour, well grown, sound, well skirted, well classed, free from fault

Good/Super—A: Good colour, well grown, sound, well skirted. Free, may contain very slight fault, suitable spinner

Good—BB: Good colour, well grown, well skirted, free or practically free from seed, may contain slight tender

Good/Ave.—B: Good topmaking, fair to good colour, skirted, may contain odd cott and/or very slight seed

Average—C: Topmaking, fair colour, may contain few cotts, may be unskirted and/or bush stained and/or part seedy

Ave./Inf.—D: Average to inferior topmaking, may be poor colour, may be cotty and/or seedy, unskirted and/or bush stained

Inferior—E: Any wool inferior to the above-mentioned grades

General: Hairy or badly bred wools must be thrown down in grade

It will be noticed that the tolerance of faults gradually increases until D style includes most of them. Wool has to be really bad to be classified as E style. At times the grower will need to think carefully about skirting. If most of his clip is only C style, skirting may make little improvement and actually show a financial loss with today's high labour costs. With B style or better, skirting will normally become increasingly profitable, but the grower can always get helpful advice on this point from his broker or from the Department's Sheep and Wool Instructors. Obviously to show a profit the value of the remaining fleece after skirting plus the value of the skirtings less the labour cost must total more than the value of the unskirted wool.

Colour

Other things being equal, the whitest and brightest wool is the most valuable. The reason is simple; white wool is required for white fabrics and for dyeing in any of the delicate pastel shades. Because discoloured wool has to be dyed in the darker shades to hide its shortcomings, it does not meet with the same competition.

Many things can discolour wool and most are avoidable. Some Merino wools scour very white, but nearly all New Zealand Romney type wools have a characteristic creamy tint which is normal and natural. Black sheep and sheep carrying odd pigmented (black or brown) spots or fibres inherit these characteristics and their incidence can be reduced by culling and selection. Other sheep produce an excessive quantity of heavy, discoloured yolk which may lead to permanent staining of the fibres. Some seem to be particularly prone to develop bacterial stains from the effects of prolonged wetting of the fleece. There is some evidence that these faults could be bred out.

Sheep can easily acquire natural stains such as log or bush stain from charcoal on recently burnt land. Fortunately this scours out readily and buyers know this so do not penalise it too heavily. Other stains such as bracken and inkweed stains are readily acquired but not so readily washed out and the value of the wool suffers accordingly.

The worst stains are the man-made ones for which there is seldom any excuse. Phenothiazine drenches will stain the wool whether spilt on it direct or passed out later in the urine. This stain is completely fast to scouring and greatly devalues the wool. Prevention is the only practical policy. Bluestone from drenches or foot-rot baths is almost as bad. Not only does it stain the wool, but even a trace of copper, too little to be noticeable, is enough to affect the dyeing properties of the wool.

Approved wool-marking preparations, including raddles, crayons, and tupping pastes, are now scourable provided they are not spoilt by diluting with engine oil or the like. However, do not be too liberal with brands; buyers have complained about them for more than two centuries and are still suspicious of even the approved ones.

True dip stain is rare and where it occurs it is due to some abuse of the dip. A dirty, dry, harsh-handling band across the tip of every staple (down to skin level at the time of dipping) is the usual result of putting too many sheep through the dipping bath without changing the dipping fluid.

Bloom dips may or may not be scourable, but are always treated with suspicion by wool buyers. Wise wool growers do not use them.

There are many other obvious sources of stain in wool; for example, shed stain or pen stain from sheep getting down on the dirty floor of the woolshed, tar or unsuitable disinfectant used on cuts, dust from droving on roads, earth and sand from sheep rubbing on banks, and so on, which may or may not be avoidable.

The buyer knows that some of these stains, like log stain, will scour out and he does not discount his valuations too heavily. The known and suspected unscourable ones will be treated alike; if affected wool is bought at all, it will be at a heavy reduction. The moral is obvious: As far as possible keep all stains separate unless the whole clip is affected, as with dust.

It should be remembered that whether it is a stain or some other fault, if the buyer finds a little of it, he will immediately wonder how much more there is scattered through the clip that he cannot see and his normal reaction is to play safe. Either he does not buy the wool or he drops his price. In the rare case where he takes a risk and buys the line at full market rates only to find later that the fault was more extensive than he suspected, he will not only avoid the clip in the future, but he is quite likely to warn his friends about it. If a grower has been successful in building up a good reputation for his clip, he should guard it jealously.

Evenness

One of the chief advantages the synthetic fibres have over wool is their uniformity of diameter, length, colour, other physical characteristics, and even price. Normally with wool there is variation in the fibre, within the staple and the fleece, and between individual fleeces. Variations between fleeces can be taken care of by classing and binning, and within fleeces by sorting, but variations within the staple and the fibre go right back to the stud breeder. If the studmasters can offer the rest of the industry rams which are as uniform in their fibres, staples, and fleeces as careful breed-

ing can make them, wool growers will be well on the way toward providing the uniformity the buyer would like.

In culling for wool the individual flock owner should at least take uniformity within the fleece into account. It is normal for New Zealand sheep to grow the finest wool on the shoulder and the coarsest on the britch, but the gradient between these should not be too steep. Sheep with coarse, hairy britches should be culled as ruthlessly as possible. Others may show stylish wool with plenty of character on the shoulder which tails off to nondescript, mushy fleece on the flanks. Weak-backed sheep, showing tender, water-stained wool, are other uneven types which should be culled as soon as possible.

A fleece with long, tapering tips to the staples gives outward evidence of variation in fibre length within these staples. Some fibres extend the full length of the staple, but most of them fall short of this by varying degrees. These long, exposed tips soon become weathered by sun and rain and do not take the dye evenly, so are disliked by buyers; and not only for this reason, but because they also lead to more fibre breakage and waste. A blocky, tipped staple on the other hand is a better proposition on both counts.

Variation of diameter along the fibre happens when there are breaks and tender portions. These may not be sufficiently well developed to have much effect on the wool's commercial value; on the other hand the check to fibre growth may be so severe that many fibres cease to grow and are shed into the rest of the fleece. Here they get tangled and felted up to form the typical cott. Because of their limited appeal cotts should be kept separate from the remainder of the clip, for though at times they sell quite well on their own, they will drag down the value of the rest of the wool if left in.

Any wool grower can achieve under reasonable conditions enough uniformity in his clip within a few years to make its preparation easy and at the same time please the buyer. To achieve this the farmer must buy rams with good fleeces from a reliable source and not chop and change from one breeder to another; and he must cull and select on wool to the maximum extent that his lambing percentage will allow.

So-called "corrective mating" by breeding the strong-woolled rams with the fine-woolled ewes, and vice versa, will never produce uniformity in the clip. Rather determine what breed and quality of wool suits the country, buy the necessary rams to give this wool (remembering that they will have to be about one count interval stronger than the ewes), and continue to mate all ewes to these uniformly woolled rams. In a few generations the rams will have stamped their wool type on the whole of the clip. The reader may well object that all this is easier said than done, but unfortunately no easy way or short cut is available.

Handle

Probably more misleading verbal and written information has been given about "handle" than any of the other fleece characteristics, with the exception perhaps of density. Handle can be affected by so many things and is so difficult to interpret correctly that the average wool grower can safely leave it out as a major consideration in the preparation of his clip.

Dust, a cold day, and the presence of hairiness can all contribute to harsh handle. A judge asked to grade the same mob of sheep on handle on two separate occasions is likely to vary widely. The same applies to attempting to grade sheep on the density of their wool; that is, the number of fibres per square inch. This also is largely a waste of time by hand and eye methods.

Some wools are truly harsh handling, the reasons being not yet fully understood, but probably mainly due to the kinky nature of the fibre coupled with its large diameter. Fine-diameter fibres seem to be soft handling irrespective of fibre configuration. If there is really no doubt about the harsh handle of a fleece, grade it down, but it is quite possible that in this case the whole clip will be harsh handling, as this fault seems to be strongly inherited.

Lustre

In some of the older textbooks on wool quite a feature is made of "lustre" and the classification of wools into "lustre" and "demi-lustre" types and so on; in fact the importance of this characteristic tended to be exaggerated. Lustre is a natural physical characteristic that a wool exhibits in varying degree and is largely associated with fibre diameter and breed. A Lincoln wool, for example, has coarse fibres with relatively large, smooth, close-fitting scales. Because of this the fibres reflect light to a large extent and are lustrous, like a glass rod. At the other extreme Merino wool has fine fibres with small scales showing well-defined, projecting edges. These fibres break up and scatter the light which is reflected and thus appear bright or white, like powdered glass.

Varying degrees of lustre accompanying breed type and count are therefore something the wool buyer accepts and does not worry about unduly, nor does the grower have to concern himself consciously about this characteristic, which can be safely left to look after itself.

(To be concluded in next month's "Journal")

New Laboratory Block for Rukuhia

THE architect's model shown above is of the new laboratory block which is to be built at the Department of Agriculture's Rukuhia Soil Research Station near Hamilton. The new block will replace the present inadequate facilities, which are housed in an old homestead on the station and in temporary buildings some 5 miles away. The building will have two wings—one of two storeys and one of a single storey designed to take another floor later. It will have a floor space of 21,000 sq. ft. Provision has also been made for a future administration block. The building was designed in the Hamilton office of the Ministry of Works.

Effect of "Entramin A" on Sexual Maturity and Egg Production of Pullets

AN investigation at the Department of Agriculture's Poultry Demonstration Plant at Upper Hutt in 1955-56 and reported on in the September 1956 issue of the "Journal of Agriculture" showed that "Entramin" as a cure for blackhead in chickens subsequently affected the maturity and egg production of pullets treated with this drug. "Entramin" was withdrawn from sale for treating chickens and "Entramin A" sold as an alternative. "Entramin A" has now been tested for any adverse effects on laying pullets and in this report J. Edmondson, Poultry Experimentalist, Department of Agriculture, Upper Hutt, and F. C. Bobby, Superintendent, Poultry Industry, Department of Agriculture, Wellington, review the results obtained with "Entramin A".

THOUGH "Entramin" (2-amino, 5-nitrothiazole) has proved to be effective for the control of blackhead (infectious enterohepatitis) in chickens, it has been found to have a detrimental effect on sexual maturity and egg production.

It has been demonstrated by Pino and Hudson (1952)* that 2-amino, 5-nitrothiazole when used at levels common for treatment of blackhead caused delay in sexual maturity and when used continually at a prophylactic level completely inhibited sexual maturity. Work by Edmondson and Bobby (1956) supported these findings and in addition showed that growing pullets receiving commonly used levels of the drug at either 7 or 13 weeks of age gave a marked reduction in subsequent egg production.

As a result of the work reported by Edmondson and Bobby it was decided to carry out a similar investigation on the effect of feeding "Entramin A" at levels recommended by the manufacturers. "Entramin A" is a 22.5 per cent. pre-mix of acetamidonitrothiazole, which is the acetyl derivative of 2-amino, 5-nitrothiazole. It is a more stable compound, and reports indicate that it is at least as effective as 2-amino, 5-nitrothiazole and may be less toxic.

This report presents some of the data on the investigation.

* J. A. Pino and C. B. Hudson, "Duration of Sexual Retardation in S.C. White Leghorn Pullets and Cockerels Following 'Enheptin' (2-amino, 5-nitrothiazole) Feeding", "Poultry Science", vol. 32, pages 650 to 655, 1953.

Procedure

All Australorp pullets used in the experiment were hatched on the same day from a mass-mated flock of hens at the Poultry Demonstration Plant. They were floor brooded and kept intensively throughout the experiment. At 6 weeks of age the pullets were divided at random into 8 groups of 25 pullets each and placed on an all-mash ration which remained unaltered throughout the experiment. The mash was made up as follows:—

	lb.
Dehydrated lucerne	5
Bran	5
Pollard	10
Ground wheat	35¾
Ground maize	10
Ground barley	20
Meat meal (60 per cent.) ..	6
Dried buttermilk powder ..	4
Ground oyster shell	2
Manganised salt	½
Vitamin A and D_3 pre-mix	1¼
	100

To this basic formula was added "Entramin A" as a pre-mix to give dietary levels of acetamidonitrothiazole as shown in Table 1. Duration of treatment is also given. The drug was administered beginning at 13 weeks of age at which time the number of birds in each group was reduced from 25 to 23.

TABLE 1—LEVEL AND DURATION OF DOSAGE

Groups	Level per cent.		Duration (weeks of age)	
1 and 2	0.1	(Curative)	13-15	(2 weeks)
3 and 4	0.05	(Preventive)	13-19	(6 weeks)
5 and 6	0.05	(Preventive)	13-continuous	
7 and 8	Control			

Food and water intakes were not controlled.

Records were kept of food consumption, body-weight gain, and egg production.

▼ A group of pullets showing delayed maturity after being fed with "Entramin A". Note the lack of development of comb.

ENTRAMIN A . . .

The experiment was continued until the birds were 40 weeks of age and artificial lighting was not used at any time.

Results

Food Consumption and Body-weight

Table 2 gives the food consumption in fortnightly periods from 13 weeks of age to 23 weeks of age and Table 3 shows the body-weight over a similar period. From these figures it appears that "Entramin A" at the levels used has no detrimental effect of practical significance on intake of food and body-weight gain as compared to the controls in groups 7 and 8.

Sexual Maturity and Egg Production

Table 4 shows that the control pullets began to lay at 22 weeks of age. Groups 2 and 3 on the highest dietary level of "Entramin A" (0.1 per cent. acetamidonitrothiazole) reached sexual maturity as indicated by onset of lay 5 weeks later. Fed at the lower level recommended as a prophylactic measure groups 3 and 4 receiving the drug for a 6-week period came into lay 1 week later than the controls. Groups 5 and 6 at the same level fed continuously showed a delay of 2 weeks.

TABLE 2—FOOD CONSUMPTION

Weeks of age	Groups 1 and 2 2 wks.*	Groups 3 and 4 6 wks.*	Groups 5 and 6 Continuous*	Groups 7 and 8
	lb.	lb.	lb.	lb.
13 to 15 ..	132	134	133	141
15 to 17 ..	155	152	156	150
17 to 19 ..	146	144	149	152
19 to 21 ..	161	155	158	165
21 to 23 ..	179	181	183	186

* Drug treatment period.

TABLE 3—BODY-WEIGHT GAIN

Weeks of age	Groups 1 and 2 2 wks.*	Groups 3 and 4 6 wks.*	Groups 5 and 6 Continuous*	Groups 7 and 8
	lb.	lb.	lb.	lb.
13 ..	126	133	136	135
15 ..	142	151	152	150
17 ..	162	172	169	172
19 ..	179	183	180	186
21 ..	195	193	191	200
23 ..	212	215	216	220

* Drug treatment period.

effect when both factors are involved. Table 5 shows the effect of "Entramin A" at the dietary levels used in this test on sexual maturity and egg production as separate items and also combined in terms of the average number of eggs laid per bird to 40 weeks of age.

The results demonstrate that the use of "Entramin A" at the levels tested retards sexual maturity and causes a reduction in egg production. Pullets fed continuously on a level of "Entramin A" commonly used for the prevention of blackhead laid an average of 36 eggs per bird fewer than the controls up to 40 weeks of age. Pullets

important and indicate the necessity for caution when this drug is used to control blackhead in chickens.

This study was not concerned with the treatment of blackhead, but was an investigation into the effect of "Entramin A" on disease-free chickens.

Recommendations

A poultry farmer requiring to control blackhead on his farm is faced with the fact that both the disease and its treatment can result in financial loss. Recommendations can be made within certain limits. The routine medication of mashes fed to all growing stock as a prophylactic measure is not advisable. Where an outbreak of blackhead occurs and treatment is essential it is strongly emphasised that only the batch of chickens directly affected should be treated.

Results of the investigation point to the advisability of use of preventive rather than medicative measures. Much can be done by greater attention to management and hygiene on the farm, the prevention of overstocking in the house and on the ground, and by ensuring that the birds receive a nutritious and balanced diet. Lack of attention to details of management and care of stock plays a big part in rendering chickens more susceptible to blackhead.

TABLE 4—SEXUAL MATURITY AND EGG PRODUCTION

Percentage weekly egg production (bird-day average)

Groups	Dosage level	Dosage period from 13 weeks of age	(weeks of age) 22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1 and 2	0.1	2 weeks						1	9	21	24	28	34	26	38	42	49	56	61	65	67
3 and 4	0.05	6 weeks		2	4	9	9	16	20	23	27	33	37	40	42	41	51	69	63	65	64
5 and 6	0.05	Continuous			½	5	9	13	15	16	14	15	19	19	21	22	24	24	31	34	35
7 and 8		Control	2	7	9	15	35	52	56	62	56	54	48	44	47	48	57	57	59	56	50

Where delay in sexual maturity occurs it is reasonable to expect a loss in the number of eggs laid to a given age (in this case 40 weeks). Rate of production once laying has begun could well be the same. In measuring rate of lay as distinct from a reduction in the number of eggs laid due to delay in sexual maturity it is necessary to compute on egg production from onset of lay in each group. This has been done on a weekly per cent. basis. In addition to being shown as a weekly average in Table 4 egg production has been summarised in Table 5 to give the per cent. production from the time each group came into lay to 40 weeks of age.

The control pullets reached 50 per cent. production in 6 weeks from start of lay and averaged 40 per cent. production. This is significantly higher than any of the treated groups. Groups 5 and 6 receiving a low dietary level of "Entramin A" continuously laid at the low rate of 19 per cent. production.

Though delay in sexual maturity and a reduced rate of lay are important in the pattern of egg production and must be differentiated between in this study, the practical poultry farmer will be concerned with the combined on curative and preventive levels for a limited period laid 15 and 20 respectively fewer than the controls. Such losses are

TABLE 5—SUMMARY OF SEXUAL MATURITY AND EGG PRODUCTION

	Groups 1 and 2	Groups 3 and 4	Groups 5 and 6	Groups 7 and 8
Sexual maturity (weeks of age)	27	23	24	22
Average per cent. production (bird-day)	35	35	19	40
Average eggs per bird	37	42	21	57

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during August 1957 with comparative figures for the same month of 1956 have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

Month	Creamery (tons)	Whey (tons)	Total (tons)	Percentage Inc. or dec.
August 1957	11,191	110	11,301	—
August 1956	10,549	113	10,662	—
Increase or decrease	+642	—3	+639	+5.993

Butter in store at 31 August 1957 was 14,992 tons

CHEESE

Month	White (tons)	Coloured (tons)	Total (tons)	Percentage Inc. or dec.
August 1957	1,618	40	1,658	—
August 1956	1,746	—	1,746	—
Increase or decrease	—128	+40	—88	—5.040

Cheese in store at 31 August 1957 was 7,635 tons

If these figures are converted into butterfat equivalent, there is an increase of 5.236 per cent. in butterfat graded for August as compared with the corresponding period of the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place from time to time they are not necessarily a true indication of production trends.

Control of Nassella Tussock

By L. J. MATTHEWS,
Weeds Research Officer, Department of Agriculture, Wellington

CONTROL of nassella tussock, which is a serious weed in parts of Canterbury and Marlborough, has been the subject of investigation for many years. It is, however, only during the last few years that much progress has been made with chemical methods of control.

EXPERIMENTAL work has shown that it can be satisfactorily controlled with dalapon at rates up to 30lb. per acre. This gives control when applied at almost any time and its use is recommended in preference to other chemicals.

TCA at rates of up to 75lb. per acre gives satisfactory control, but to ensure a satisfactory kill its time of application is limited to the hot, dry months of January and February.

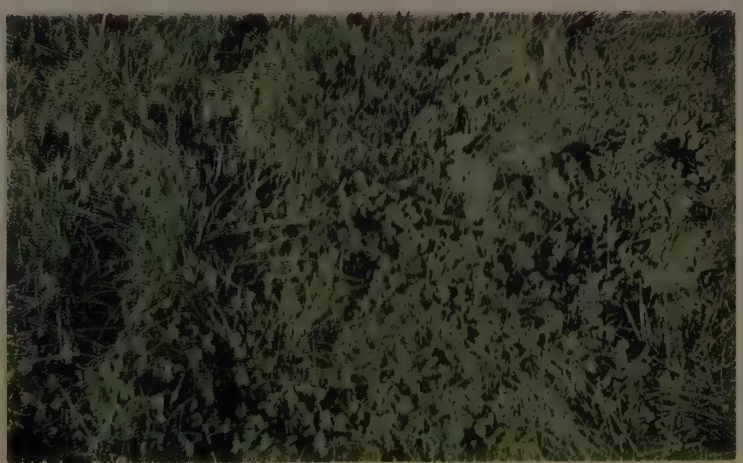
At the Wrekin, near Blenheim, over the past 3 years the equally important step of replacing nassella with desirable vegetation has been investigated by J. B. Beggs and W. F. Leonard, Instructors in Agriculture, Blenheim, with outstanding success. In the trial where nassella was not killed with either TCA or dalapon before oversowing, the strike of oversown species was poor or nil. Where the nassella was first destroyed with chemicals oversowing was successful and reduced further nassella establishment. Similar results have been secured on small-scale trials in Waipara and Amuri Counties.

Two years ago a block of 55 acres of steep hill country was oversown and topdressed by air after the nassella had been destroyed with TCA. To date a strong pasture of ryegrass, cocksfoot, and white, red, and subterranean clovers has been obtained with only occasional seedlings of nassella appearing. Before this, 7 acres would not support 2 wethers.

This method of control and replacement has been so successful that it has replaced cattle grazing of nassella to restrict seeding. The use of cattle has not been satisfactory, as the useful vegetation is eliminated by grazing, allowing the area to become nassella dominant. The main problem still to be studied is the most suitable management to maintain the oversown areas after the nassella has been destroyed by chemicals. Further work is also required to determine if ATA can be used to reduce the quantity of dalapon required, because this would lower the cost of treatment.

A survey has been made to determine the relative effectiveness of controlling nassella by grubbing and by chemicals. Grubbing costs two or three times as much as chemical control and is less satisfactory, because the nassella takes a long time to decompose after grubbing. Nassella destroyed by dalapon and TCA rots quickly and the outstanding success of oversowing may be in part due to the release of nutrients from this organic matter.

The most difficult problem in nassella control is on areas where oversowing does not lead to the successful establishment of replacement species. The present nassella can be destroyed, but unless it can be replaced satisfactorily further infestations will occur. Persistence with chemicals may be the only solution.



A good balance of ryegrass and clover where dense nassella once grew.

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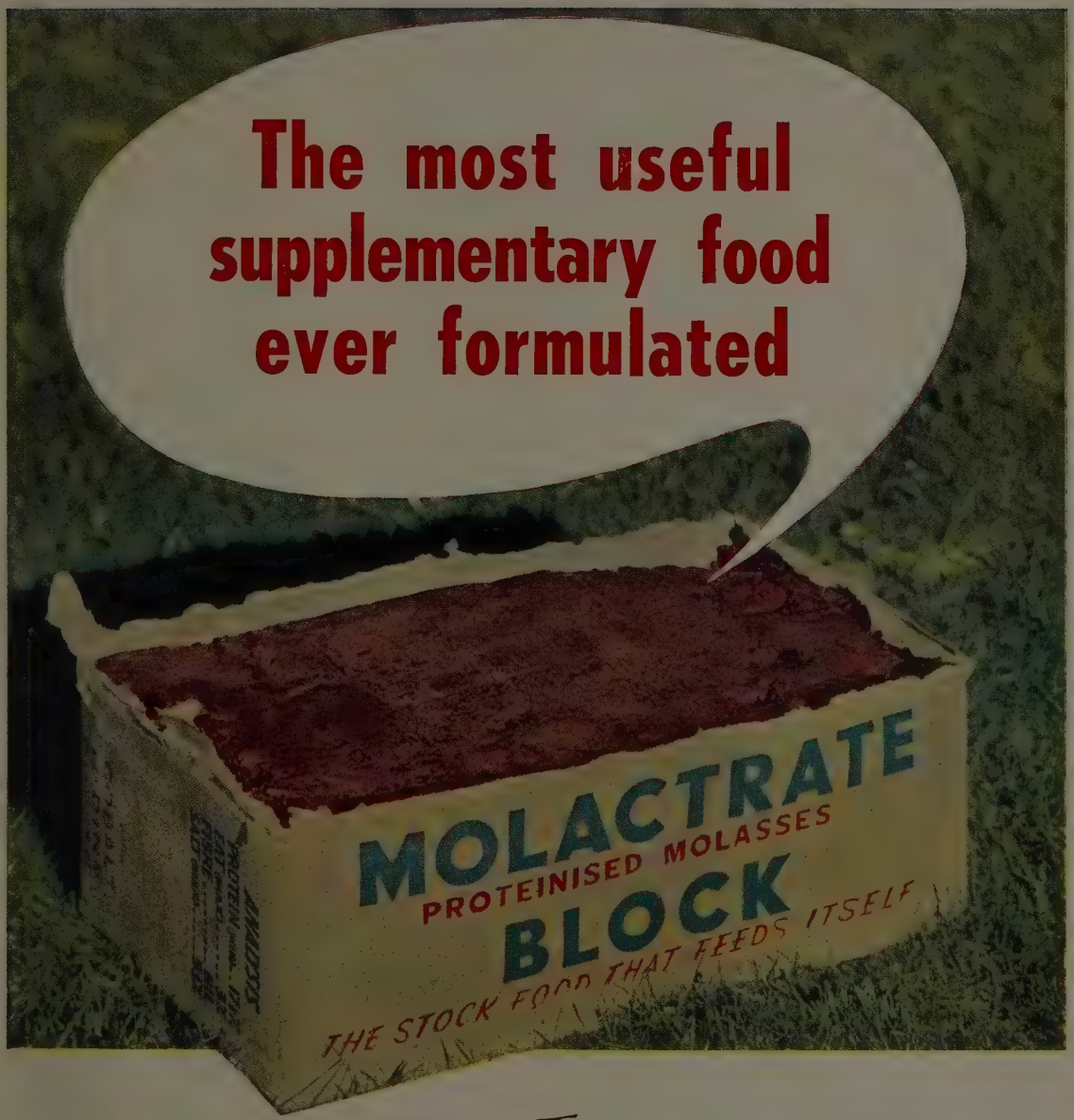

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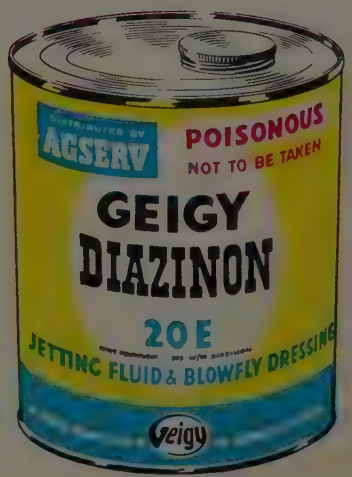

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FIRST IN THE FIELD WITH DIAZINON

White Clover at High Altitude

By H. M. SIEVWRIGHT,
formerly Fields Instructor,
Department of Agriculture, Tekapo

FROM the early days of settlement South Island high country runholders have attempted, with commendable initiative and varying success, to introduce pasture plants into the natural tussock grassland swards. Among them has been white clover, which has survived and played a useful role, even at high altitude.

In a saddle at 4600ft.: Over 3 acres of white clover, with *Poa pratensis* the other dominant.

WHEN wind erosion threatened along the 80 miles of netting fenceline erected in the 1880s to check the spread of rabbits into Canterbury from Otago the settlers sowed seed of red fescue to counter the formation of windblows. Today the red fescue established by those early sowings continues to carry out its important role in soil conservation.

The desire to improve the content of palatable plants within the natural tussock swards is shown by the following extracts from a pioneer-stage diary relating to one of Canterbury's well-known runs:—

SEPTEMBER 18, 1855
Burnt tussock and speargrass on flats.

SEPTEMBER 20, 1855
Sowed clover on ashes on flats.

The clover originated by these sowings of 1855 still plays a very useful role on this block of tussock flats, which during the past 17 years have been topdressed annually, the clovers and tussocks thriving in association.

Apart from deliberate oversowing of seed on to burnt or unburnt tussock country, it was not an uncommon practice for the more enterprising runholders to place seed on the backs of their sheep after shearing in the hope that as the animals travelled over to their high summer pastures this seed would become usefully scattered and established over the holding.

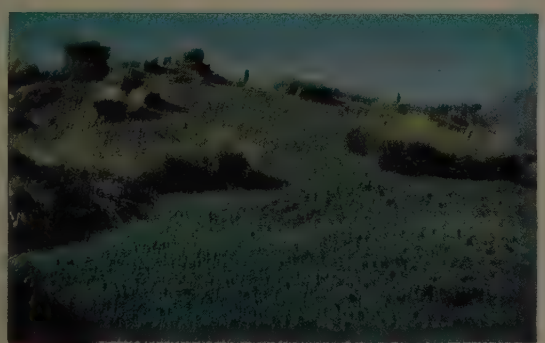
Many successful establishments of seed have been achieved either in this way or by the survival of seed taken in by animals during grazing and subsequently voided by them.

For 8 miles north from the head of Lake Tekapo white clover thrives among the silver and hard tussock associations. This clover responded well to an aerial application of superphosphate in 1951.

On a steep mountain side with a north-easterly aspect rising from 2700ft. to 4600ft. healthy volunteer white clover plants thrive and set seed.

In a saddle at 4600ft. over 3 acres of white clover thrive, with *Poa pratensis* the other dominant among sorrel, bidi-bidi, *Stellaria* spp., snowgrass, and *Aciphylla* spp. The area is very closely grazed and much of it is a closed sward. There is little seed head, because of the heavy grazing by sheep and wild life.

The white clover in association with the other species has sealed effectively a shelf caused by wind and animals. Normally such a shelf is eroded by frost lift and windblow. This area has not been topdressed. This useful role of volunteer white clover is also frequently evident at high altitudes in the Waimakariri, Rakaia, and Rangitata headwaters.



Part of the area shown at the top of this page. It is very closely grazed and much of it is a closed sward.

The white clover, in association with the other species, has effectively sealed a shelf caused by wind and animals.

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Sheep grazing short grass. It is strongly recommended as an aid to the prevention of ill-thrift that short feed must be available for all lambs in spring and summer. To achieve this, concentrated stocking and more widespread mowing are necessary to stop fast-growing feed becoming rank in some seasons.

Lamb Ill-thrift in Ashburton County

By R. C. STUART, Agricultural Economist, H. H. TOCKER, Farm Management Officer, and E. STONYER, Research Officer in Farm Management, all Department of Agriculture, Christchurch, and H. EVANS, Research Officer in Farm Management, Department of Agriculture, Ashburton

THE problems associated with rearing good hoggets in New Zealand have been recognised for many years, particularly in the North Island, where the onset of a peculiar disease of hoggets known as "hogget ill-thrift" coincides with an apparent abundance of feed after autumn rains. Before this period hoggets thrive on a wide variety of feeds, and after it fatten readily, whereas during the outbreak they lose considerable condition and deaths occur at rates in excess of 15 per cent. In the summer of 1956-57 an outbreak of ill-thrift in Ashburton County resulted in high mortality and drastic deterioration in the condition of thousands of lambs. The most striking feature of the trouble at first was the mass of inconsistencies and contradictions, and to obtain a factual picture a field investigation was carried out in the county in an endeavour to describe and analyse factors of pasture and livestock management and any other data relevant to the outbreak.

CHANGING growth conditions while the field work was being done and the fact that some evidence was collected by postal questionnaire and therefore could not be standardised impose the following limitations on results of the survey: Accurate comparative studies of pastures and supplementary crops were difficult, and it was impossible to ascertain accurately the thrift of lambs when they were put on various feeds, which could have a most important bearing on the results of remedial measures.

Ill-thrift may be generally described as a wasting disease occurring when there is an abundance of feed, and post-mortems, though sometimes confusing, generally reveal a picture consistent with starvation.

In 1956 Clarke and Filmer as a result of their trials maintained that

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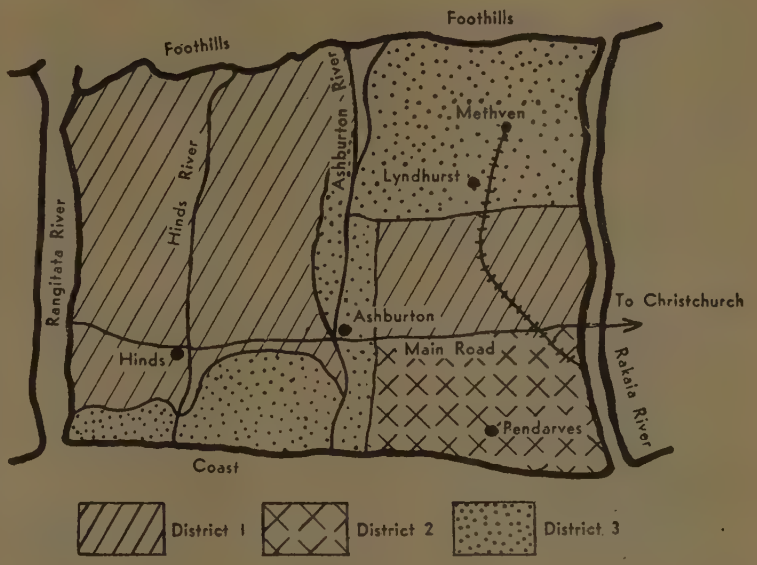
ill-thrift "is not caused by any known infections, either parasitic or bacterial, nor by deficiencies of minerals or vitamins known at present". In addition, they stated: "Ill-thrift was found to be a disease confined to autumn, and did not occur in spring, though pasture response to rain appeared visually to be similar".

The outbreak in Ashburton County was very similar to North Island outbreaks with one very striking difference. Whereas Clarke and Filmer observed that the outbreaks were confined to autumn and did not occur in spring, symptoms of ill-thrift in Ashburton County were obvious in November with deaths reaching a peak between the end of December and the third week in February.

Ill-thrift was responsible for serious economic loss in the form of reduced liveweight gain, and heavy mortalities in lamb flocks occurred throughout the county until early March, when there was an improvement, sometimes slow, in thrift. The problem was observed on all species of feed and was accompanied by climatic conditions not in the past associated with ill-thrift.

The only consistent post-mortem features were those associated with starvation. Worm burdens were generally low. There was constant evidence of the failure of lambs to eat readily the feed in front of them, and it is possible that the unpalatability of rapidly growing pasture and supplementary crops may be a factor in the development of ill-thrift. The whole problem was aggravated by a sudden change to drought conditions after the wet spring and the tremendous pasture growth until Christmas.

ILL-THRIFT IN ASHBURTON COUNTY



The survey area.

Scope of Survey

In the survey management of both affected and non-affected farms was studied and compared. As the heaviest incidence of lamb ill-thrift in the county appeared to be on farms on areas of light, shingly soil (Lismore soil series), a detailed survey was carried out in District 1 as indicated on the diagram above. This district covers Mayfield-Hinds, Hinds-Coldstream, Valetta-Winslow, and the Lyndhurst-Ashburton areas, and includes the two major irrigation schemes in Canterbury.

The management section of this article deals exclusively with District 1, but a study of the Pendarves light land area (District 2 on the above plan) revealed similar results, though the incidence was not as great.

The heavy soils of Wakanui, Eiffelton, and Methven (District 3) were the subject of an incidental study.

Survey Method

The method used in carrying out the survey may be summarised thus:—

1. A preliminary postal survey in which questionnaires were sent to all farmers (1500) in Ashburton County was the first step.

2. Concurrently, a detailed field investigation involving personal visits to 150 farms and using the questionnaire technique was made.

3. Subsequently, while the analysis work was being done on the above, a follow-up postal questionnaire was sent to farmers for additional information on certain aspects of their farm management.

In addition discussions were held with other farmers, fat lamb buyers, etc., in the affected areas, and thrifty

Recommendations

THE problem of ill-thrift as it occurred in Ashburton County seems to be a nutritional one. Lambs become unthrifty because they refuse to eat, but why they refuse is unknown. Thus the farmer must rely on management which, in practice, has proved successful in

(a) preventing an outbreak of ill-thrift, or
(b) where ill-thrift is suspected in minimising its severity.

As a result of the recent survey the following managerial practices are strongly recommended:—

1. Short feed must be available for all lambs in spring and summer. To achieve this, concentrated stocking and more widespread use of the mower are necessary to stop fast-growing feed becoming lush and rank in some seasons.

2. Frequent regular inspection of all lambs is imperative. If lambs are offered a change of feed, see that it is being eaten readily.

3. Shift lambs to alternative feeds immediately if they show any reluctance to eat apparently attractive feed. Alternative feeds recommended are freshly irrigated pasture, new-sown pasture or lucerne, or white clover.

Also useful, but not as highly recommended as the three types of feed above, are established lucerne, hay or seed aftermath and stubble, unimproved pasture, or red clover.

Lambs must be moved immediately ill-thrift is suspected.

4. Freshly irrigated pasture (not necessarily hardened off) is the only feed on which lambs in an advanced stage of the disease will consistently recover. If this feed cannot be provided, such lambs may also thrive on new-sown pasture or lucerne (5 to 7 weeks) or pure white clover. Otherwise, offer whatever variety of feed, including hay, is available in an endeavour at least to halt the death-rate.

5. Of practical importance to stud farmers is the observation that lambs do exceptionally well on dairy farms.

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and unthrifty flocks of lambs inspected.

There are 1267 sheep farmers in Ashburton County, and of these a little over 800 returned the preliminary postal questionnaire. Not all questionnaires returned were completed, but generally good basic data were supplied.

Complete and accurate information was obtained from the 150 farmers to whom personal visits were paid. Nearly 75 per cent. of these farmers were in the worst affected areas and their data and observations provided the foundation for the report.

Two hundred follow-up questionnaires to clarify certain farm management features which emerged as significant during the analysis work were sent to farmers who had already been visited or who had forwarded the original questionnaire. The majority of these were returned with the information required.

Incidence of Ill-thrift

The data from 60 per cent. of sheep farmers in Ashburton County indicated that the known deaths directly attributable to ill-thrift were at least 20,000. Though this is not a high percentage of the total lamb crop (estimated at 1,200,000), associated with the deaths was the very serious difficulty in fattening a large proportion of the remaining lambs.

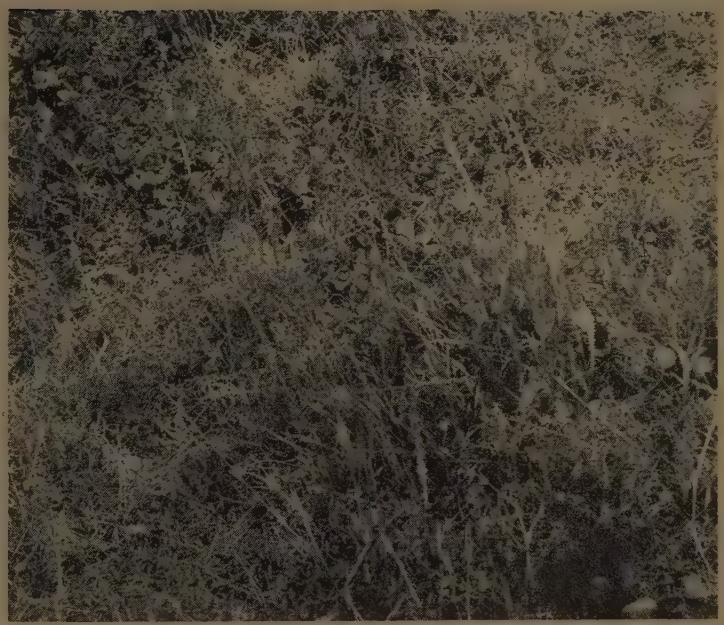
The heaviest individual loss was over 900 lambs, or 53 per cent. of total lambs tailed, and seven other farms suffered losses in excess of 20 per cent. The remaining lambs on these farms were, almost without exception, affected by ill-thrift. On the other hand there were farms on which no lambs died from ill-thrift, but on which nearly every lamb was unthrifty. About 10 per cent. of farmers had both thrifty and unthrifty mobs.

Of 764 returns analysed, 46 per cent. of the flocks were affected and 54 per cent. had no signs of ill-thrift. (The 46 per cent. includes flocks which were affected but suffered no losses.) The degree of incidence measured by actual losses on the affected farms may be summarised thus:—

Of the 350 affected farms (46 per cent. of the farms in the county) 252 (72 per cent.) had 0 to 5 per cent. deaths, 70 (20 per cent.) 6 to 10 per cent. deaths, 14 (4 per cent.) 11 to 15 per cent. deaths, 7 (2 per cent.) 16 to 20 per cent. deaths, and 7 (2 per cent.) over 20 per cent. deaths.

In District 1, where the chief study was made, there were 10,500 deaths from ill-thrift or 4.7 per cent. of the 223,000 lambs tailed. There were nearly 300 farms in this district for which there were reliable returns, and of these 64 per cent. had affected flocks and the break-up of mortality rates on these affected farms was similar to that stated above.

ILL-THRIFT IN ASHBURTON COUNTY



A pasture management practice that definitely appeared to be associated with ill-thrift was the provision of rank and bulky feed such as that illustrated above. When the feed was kept at the 1in. to 3in. stage during the spring and early summer flush, and this control was continued during summer, there was little or no trouble.

Thus the complete extent of the outbreak cannot be measured accurately, but it may be said that:—

1. Possibly half the total sheep farms in Ashburton County were affected to some degree by ill-thrift.

2. Losses on two-thirds of these affected farms were not 5 per cent. above normal losses.

3. Returns from 60 per cent. of sheep farmers indicated that the minimum number of lambs lost from ill-thrift was 20,000 or nearly 2 per cent. of total lambs tailed. This figure is in addition to the average annual lamb losses from tailing, estimated at between 3 and 4 per cent.

4. Inquiries in June showed that fears in March of a large carry-over of lambs proved groundless, and the number should not have exceeded 50,000.

5. In addition, the possible serious economic loss in the form of reduced liveweight gains was offset by the buoyant prices ruling for fat lamb meat in the latter part of the season.

Soils and Farming

The light, shingly soils of Districts 1 and 2 are immature soils which are low in plant nutrients, have a high lime requirement, and are inherently droughty.

The main system of farming is sheep and cropping, with the emphasis on the production of fine wools and fat lambs under dryland conditions, but with greater emphasis on fat lambs under irrigation farming. Pasture seed crops are taken whenever possible, but both cash cropping and forage cropping have diminished in importance.

The use of lime, superphosphate, DDT, and certified seeds has allowed the establishment of longer-lived and more productive pastures with a subsequent increase in stock-carrying capacity from 1 to over 2 ewe equivalents per acre.

The utilisation of increased areas of lucerne and lucerne-cocksfoot for summer grazing and the shutting up of autumn pastures for winter grazing with lucerne hay as supplementary feed have eliminated the practice of ploughing up nearly a quarter of the farm annually for pasture renewal and supplementary fodder crops.

The heavy soils comprising District 3 are some of the most fertile in Canterbury and maintain pasture growth very well except in the driest of seasons. Formerly this land grew large areas of wheat, but at present it is used chiefly for fat lamb and wool production, with pasture seed production frequently an important feature of the annual programme. Cash crops are still grown, but on a much reduced scale.

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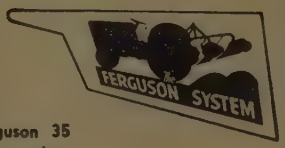

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Climatic Conditions

Winchmore records show that there were 8.03in. more rain in 1956-57 than in the average season. Very heavy rain fell at the end of September and the beginning of October, there being 5in. during the first 10 days in October, 2in. in the first 10 days in November, and nearly 2in. at the end of November. Otherwise, in both October and November the weather was generally overcast and mild.

Pasture growth by this time was exceptional on all farms and stock numbers were quite inadequate to cope with the flush, with the result that most pastures quickly ran to seed. Two inches of the 2½in. of rain recorded in December fell in the first half of the month, which was one of strong north-west winds and frequent thunderstorms. Evaporation and rainfall were about equal during the first 15 days, but during the last 10 days evaporation was considerably higher than rainfall.

At this stage there was much surplus growth which had gone to seed. Large areas were being made into hay, but most stock were feeding on rank pasture.

January was hot and dry and evaporation was kept high by hot north-west winds. The soil temperature, which was up to 60 degrees in November, rose to 65 to 70 degrees. There was a rapid drying off of both pastures and rape early in the month and negligible growth throughout the month. The little rain did nothing to relieve the dryness and stock were existing on dried-off, stalky grass which a few weeks earlier had been lush, rank feed.

February continued dry and hot and the air temperature exceeded 80 degrees on 15 days. Of the total rainfall of 2.31in., 1.5in. fell during the last 10 days, but evaporation remained higher than the rainfall until the last 4 days. The period 25 to 28 February was the first since the period 16 to 19 December in which rainfall significantly exceeded evaporation. Growth remained at a standstill.

In March the weather was mild and humid without strong winds. With 5.6in. of rain and low evaporation it was relatively wet. About 3.3in. fell during 6 to 10 March and a rapid regrowth of pasture was apparent, and by the end of the month pastures were again carrying an abnormal amount of feed. (Incidentally, the 1956-57 season was preceded by two dry seasons each of about 15in. of rain.)

Conditions were similar over the remainder of the county except that it was somewhat wetter in the Mayfield district and somewhat drier in the Pendarves area. The change in the condition of pastures during early March appears to have occurred at about the same time.

Beginning and End of Ill-thrift

Broadly, there were three sets of differing environmental conditions during which lambs became unthrifty in varying degree. Some flocks were slipping during the period of mild weather and exceptional pasture growth in November and December, and losses first occurred about mid-December.

Losses reached a crisis between mid-January and mid-February during a period of hot, drying winds not usually associated with ill-thrift. Deaths ceased with the freshening of feed after rain in late February and early March, but many thousands of lambs were still in a wretched condition despite their readiness to eat.

However, a minor outbreak which conformed more to the pattern of North Island hogget ill-thrift now occurred in flocks not previously affected.

It was obvious, however, that the majority of farmers found that losses ceased or tailed off when ill-thrifty lambs were fed on fresh growth after rain in late February to early March. The remedial steps taken by farmers whose losses ceased before the heavier falls of rain are discussed under the heading "Remedial Measures".

Feed

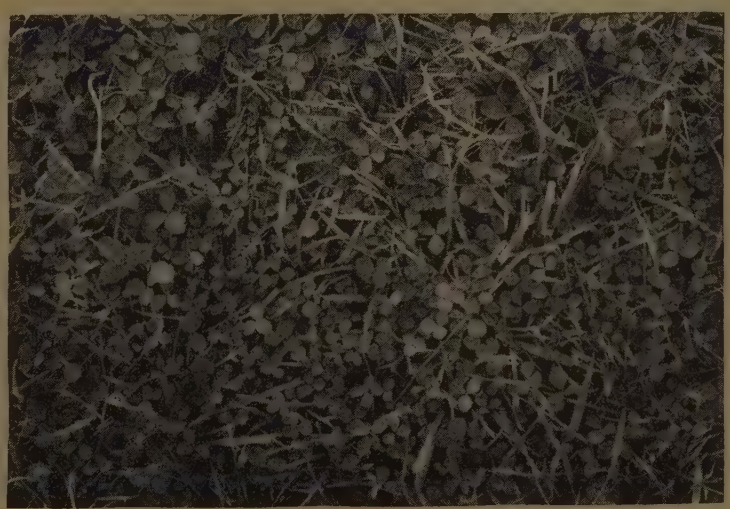
A study was made of the species and types of feed that affected flocks were on before and after the onset of ill-thrift and that non-affected flocks were on before and after weaning. There were 75 non-affected flocks and 160 affected, and as all farms concerned were managed under the same environmental conditions, a comparison of the feeds and associated managerial practices was possible.

Where possible, paddocks were inspected to confirm botanical composition, and where follow-up postal questionnaires were used detailed descriptions were called for.

Ill-thrift occurred on a wide variety of feeds and there appeared to be no relationship between species of feed and severity of ill-thrift. In many instances thrifty flocks were grazed on similar feed and this included improved ryegrass-white clover-dominant pastures, subterranean clover-dominant pastures, unimproved pastures, lucerne, lucerne-cocksfoot, red clover, white clover, hay or seed aftermath, stubbles, and rape-kale.

Improved pastures were those containing the more productive species such as perennial ryegrass, short-rotation ryegrass, cocksfoot, red clover, white clover, etc., and which were maintained by regular topdressings of phosphatic manures and lime. Lucerne and lucerne-grass mixtures were also included under this category. Unimproved pastures were those which had reverted to browntop, sweet vernal, hairgrass, goosegrass, and flat weeds, and included under this heading were tussock and river-bed run-offs.

Naturally the majority of farmers, with both affected and non-affected lamb flocks, topdressed with lime and superphosphate. Some farmers used



Irrigated white clover-dominant pasture. If lambs show any reluctance to eat apparently attractive feed, they should be shifted to alternative feeds such as freshly irrigated pasture, newly sown pasture or lucerne, or white clover.

copper extensively and such elements as boron, cobalt, manganese, magnesium, and iron were also tried with doubtful results.

More than a third of the affected flocks first showed signs of ill-thrift on rape. Thrifty mobs in excellent condition until put on rape fell off in condition visibly in 2 or 3 days and the mortality rate was frequently high. There was a very marked reluctance by lambs to eat rape, and it was observed that the death-rate or deterioration in condition was always greatly accelerated when lambs with signs of ill-thrift were transferred to rape. Conversely, rape crops in the same locality not always appearing suitable for feeding off did not induce ill-thrift.

A study of the rape crops in regard to sowing dates, method of sowing, varieties, dates fed off, method of feeding off (with run-offs, etc.), and condition at utilisation revealed nothing significant.

As explained earlier, pastures underwent striking changes with the advent of sudden drought conditions in January and February, but there were fresh outbreaks of ill-thrift in previously thrifty flocks throughout these 2 months.

In many quarters rust was held responsible as the factor contributing directly or chiefly to ill-thrift. It was very widespread in pastures, particularly in the lush, leafy, subterranean clover-dominant pastures throughout November and December. After the contradictory trend of the outbreak lambs fattened readily on pastures heavily infected with rust. The fact that lambs were unthrifty on farms where there was no evidence of rust and, conversely, were thrifty on rust-infected pastures supports the contention that if rust was a factor in ill-thrift, it played a secondary role.

As there was negligible irrigation water applied before January 1957 on farms reticulated for irrigation, no study of the irrigated pastures was possible at this stage. Numbers of cattle were too insignificant for them to play other than a very minor role in the control of pastures.

Pasture Management

Thus lambs, both affected and non-affected, were on a wide range of feeds; and irrespective of topdressing practices, no feed apart from rape could be linked with the severity of the ill-thrift outbreak.

However, one pasture management feature appeared to be definitely associated with ill-thrift, and that was the provision of rank and bulky feed. Where the feed was kept controlled at the 1in. to 3in. stage during the spring and early summer flush and continued that way through summer there was little or no trouble.

It was significant that nearly 75 per cent. of the farmers who had no ill-thrift in their flocks tried either by shutting up paddocks and concentrating stock or by topping to "keep on top" of their rapidly growing pastures. Pastures thus managed did not carry as much rank growth and the provision of short feed proved a practical way to avoid trouble.

It is doubtful if winter stocking rates will ever be high enough to cope with the flush of growth, and there is a very strong case for the more widespread and constant use of the mower in an endeavour to keep fast-growing feed at the short, sweet stage for fat lamb production.

Other Farm Management Features

Lambing dates, weaning dates, and breeds of sheep were all studied, but the evidence in relation to ill-thrift was inconclusive when the two groups of affected and non-affected farms were compared.

Perhaps the most surprising feature of the lambing data was the lateness of lambing on farms on light soils where early lambing is more the accepted practice. If lambing at mid-September or later is called late lambing, 47 per cent. of the non-affected mobs and 54 per cent. of the affected mobs were late lambed. If lambing in August is accepted as early lambing, 34 per cent. of the non-affected mobs and 33 per cent. of the affected mobs were early lambed.

The date of weaning as a factor in ill-thrift could not be studied objectively, as farmers with affected mobs in December immediately weaned and drenched with phenothiazine as a precautionary measure.

There was no significant difference in the incidence of ill-thrift as between ewe lambs and wether lambs, and there was no clear-cut evidence that shutting off lambs from water during January and February had any beneficial effect. This observation could also apply to the shearing of affected lambs and rotational and set grazing of flocks.

The breeding ewes on the farms investigated were mainly Corriedale, half-bred, three-quarter-bred, or Romney, and both replacement and fat lamb rams were used. All the above breeds of sheep were generally susceptible to ill-thrift, and this observation could be applied also to stud sheep.

Remedial Measures

It was apparent that after the heavier rainfalls in early March losses ceased on the majority of farms without irrigation. The fresh growth appeared to stimulate appetites and lambs thrived on paddocks where previously they rapidly lost condition or died.

Remedial measures taken before autumn rains met with varying success under similar environments. A most important prerequisite to success with remedial measures was that the farmer should observe the deterioration in lambs early, remove them immediately from the feed they were on, and proceed with his remedial steps.

A prominent feature of ill-thrift was the reluctance of lambs to eat, but where alternative feed attractive to lambs was provided in the very early stages of the outbreak the lambs invariably recovered. There was ample evidence that unthriftiness was aggravated by the failure of farmers to move affected lambs early to alternative feed. If no immediate steps were taken to combat the disease, recovery was slow or negligible, and sometimes there was an acceleration of ill-thrift, irrespective of treatment.

Undoubtedly the most spectacular response was on freshly irrigated pastures. During the height of the outbreak, of the 23 farmers who tried their affected mobs on this feed, 22 claimed that deaths ceased immediately and, what is more important, lambs began to thrive. It is certain that these affected lambs ranged in condition from those with the first signs of ill-thrift to those at the really desperate stages with high mortality.

Apart from fresh irrigated pasture, and to a less degree new grass and pure white clover stands, recovery prospects depended on the state of thrift of the lambs at this period. Observations by the farmer on the state of the animals at various dates were difficult to standardise and weekly weight records would be necessary to give an accurate picture. Where lambs were on dairy pastures they remained healthy or recovered, but in Canterbury this management is practicable possibly only with stud lambs and hoggets.

As a remedial measure drenching with phenothiazine, trace elements, and calciferol was ineffective.

It must be confessed, too, that in a few cases, despite what appeared to be adequate observations and management, lambs failed to thrive and deaths continued.

Future Research

On the completion of this survey research into lamb and hogget ill-thrift in Canterbury is being organised along the following lines:—

1. At the Department of Agriculture's Winchmore Irrigation Research Station experiments have been designed to investigate managerial factors associated with ill-thrift.

2. Canterbury Agricultural College will undertake research into the fundamental problems of ill-thrift.

3. The recent survey will be continued more intensively on a sample of selected farms in Ashburton County.

Prevention of Swarming and Checking of Extracting Equipment

Seasonal Notes for the Domestic Beekeeper

By A. W. BENNETT,
Apiary Instructor, Department of Agriculture, Hamilton

HIVES that are showing an inclination to swarm at this time of year will have to be dealt with promptly by the beekeeper if he wishes to maintain his bee strength during the coming nectar flow and take a maximum crop of honey. His method of dealing with hives showing queen cells should be to go through each hive thoroughly and remove all queen cells present, rearrange the brood, putting all emerging brood into the top box, and young brood, eggs, and queen into the bottom box, and if necessary add another box above an excluder for any surplus honey that may be coming in. This operation will have to be repeated every 9 or 10 days. If a hive persistently shows queen cells, it will be best to requeen the hive; otherwise it will eventually swarm whether queen cells are removed or not.

THE queen in the hive showing queen cells should be found and killed, the number of cells being counted at the same time. If, say, 10 are found and 9 other colonies require requeening, go through the hives and kill the queens. The next day open up the hive with queen cells and carefully cut out 9 of them. Put a capped queen cell in each of the 9 hives dequeened the day before, after making sure no other queen cell is present in these hives. If any freshly started cells are found, they should be destroyed. If a cell is missed, the bees will destroy the cell given to them. Two days later check the hives to see if the queen cells have been accepted. If they have been rejected, the bees will have torn them open on the side of the cell, in which case give them another cell.

In 2 weeks these hives should be opened again and inspected to see if any eggs are present. If they are, the requeening of the hives has been a success and all swarming worries will be over for that season provided adequate attention is given to supering during the season.

This method of requeening should be used only if the beekeeper is satisfied with the present strain of bee he is using, as no improvement will be made. If he wishes to improve his strain of bee, he should carry out the method described in the February issue of the "Journal".

Queen cells built along the centre and bottom edge of a comb during preparation for swarming.

A super of 10 frames of foundation being placed on a hive over a queen excluder.

A queen raised under the swarming impulse usually turns out to be first class provided the strain of bee from which she was raised is satisfactory, as she will have had every attention possible from the bees right from the time the egg was deposited in the queen cell for the raising of a good queen. The hive will also be headed by a young, vigorous queen through the honey season at no cost to the beekeeper and without the use of any special equipment in raising such a queen.

Hives having a good young queen will quickly build up in hive strength. This should be watched and any hive showing signs of being a little behind the others should be helped along by being given a comb or two containing emerging brood taken from the strongest hives. Any hive well below strength and which has no chance of building up before the honey flow should be united with another, or even two more weak lots, to form an average colony.

Apiaries managed on these lines will produce a far greater average crop of honey than the apiary in which the colonies are allowed to build up or remain behind one another without any attention in this respect from the beekeeper. Most successful commercial beekeepers work their hives along these lines, as they find the method leads to more even development of hives throughout the apiary and they can work each colony during the season in a total of 4 or perhaps 5 boxes, thus saving much high, heavy lifting.

New Combs

During the swarming season bees naturally secrete a large amount of

wax. This opportunity to get frames of foundation built into combs should not be overlooked by the beekeeper, and any frames of foundation to be drawn should be given to the bees now. The placing of a super of frames with comb foundation on top of the hive at this time of year not only avoids wasting this wax, but will keep the bees busy building combs; often if the swarming impulse has not advanced too far, this will settle the bees down to work through the honey flow. Requeening may then be attended to when the flow is over.

Hives requeened in autumn should be requeened early enough for the young queen to go into the winter with a good proportion of the bees produced from her own brood. Often when late introduction has taken place and there are very few bees from the new queen in the winter cluster supersedure by the bees may take place in early spring, even though the queen may be a perfectly good one.

Extracting Equipment

Most beekeepers at this time of year will be thinking of extracting and should be prepared for it. Equipment such as cartons or tins, if not already on order from the suppliers, should be ordered at once.

General equipment used in the extracting season should be checked over and cleaned. Escape boards should be looked over and repaired and the bee escapes fitted to them should be cleaned and the springs adjusted so that they are spaced about ⅛in. apart at the ends. The uncapping knife should be cleaned and sharpened. If a steam knife is used, it should be checked over for any steam leaks at the soldered joints, as should be the steam boiler. If leaks are found, they should be repaired by the beekeeper or taken to the local tinsmith for resoldering. The rubber hose from boiler to knife should be checked and if it is faulty, it should be replaced.

Bee escape boards should be cleaned and escape springs adjusted ready for use when required.

The extractor must be cleaned and given a run to see if it is in good working order. The baskets should be fitted in the extractor during this trial run to see that they reverse when the extractor is reversed. Often when baskets are stored away from the extractor they are not marked to show which spigot they came from and sometimes they do not reverse as easily if placed on a different spigot. A little solder may be required either on a basket or at the bottom of the extractor; the honey tanks may also require the same attention. The lid to the tank may need repairing to prevent dust getting into the honey while the tank is being used.

The honey strainer should be checked over. If a wire strainer is used, see that it is in good order and nothing has damaged the wire mesh during storage. If cloth strainers are used, make sure the cloth is strong and will stand the weight of honey likely to be put on the strainer in straining.

A thorough check of this equipment before it is used will enable honey-extracting operations to be completed as soon as possible at the appropriate time and the bees will not be kept waiting for the return of their storage boxes during the honey flow.

Meteorological Records for September

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in Inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	54.6	+ 0.8	70.0	34.1	4.38	18	— 0.76	0.82	20	183
Auckland	160	55.4	+ 0.9	66.9	43.2	1.84	14	— 1.95	0.56	20	200
Tauranga	10	53.0	+ 0.4	67.2	36.5	3.29	15	— 0.93	1.32	21	178
Ruakura	131	51.6	+ 0.7	65.7	31.8	2.62	16	— 1.06	0.82	21	160
Whakarewarewa ..	1006	50.8	+ 1.8	67.0	32.5	2.78	11	— 1.96	0.79	3	160
Gisborne	12	53.2	+ 1.1	72.0	36.1	3.83	12	+ 1.21	1.78	22	187
New Plymouth ..	160	52.6	+ 0.9	63.8	37.5	3.03	11	— 1.87	0.91	28	192
Kariol	2125	46.6	+ 1.6	63.2	29.2	2.26	14	— 2.01	0.35	27	
Napier	5	53.4	+ 1.4	71.6	39.9	2.56	11	+ 0.59	0.95	21	194
Wanganui	72	51.3	— 0.8	63.4	35.9	1.43	9	— 1.11	0.50	27	161
Palmerston North ..	110	52.0	+ 1.5	65.6	34.4	2.80	14	— 0.21	0.76	27	140
Waingawa	340	50.2	+ 0.9	69.0	30.0	3.94	15	+ 0.67	0.88	4	168
Wellington	415	51.1	+ 1.2	62.9	38.3	4.51	17	+ 0.67	1.06	26	173
Nelson airfield ..	5	49.3	+ 1.1	69.0	31.0	1.57	11	— 1.59	0.34	27	209
Blenheim	12	50.4	+ 0.2	73.5	30.9	2.19	9	— 0.09	0.65	26	207
Hokitika	15	49.1	+ 1.3	63.3	28.2	5.14	13	— 3.48	1.12	18	176
Hanmer	1270	46.6	+ 0.5	69.0	25.0	6.38	12	+ 1.95	1.48	5	158
Christchurch ..	22	49.2	+ 0.5	71.6	30.1	3.97	7	+ 1.91	2.21	3	156
Ashburton	323	48.8	+ 0.9	74.5	26.8	2.93	6	+ 0.31	1.40	3	181
Timaru	56	48.6	+ 0.7	72.9	32.2	2.12	9	+ 0.17	0.95	3	156
Alexandra	520	48.8	+ 1.7	70.6	27.0	0.49	6	— 0.33	0.18	3	195
Taieri	80	47.2	— 0.5	69.0	28.0	0.82	10	— 1.11	0.35	3	140
Invercargill airfield ..	0	47.0	+ 1.3	66.6	28.8	0.54	7	— 2.68	0.21	15	177
Chatham Islands ..	140	49.4	+ 1.2	59.8	36.6	2.96	17	+ 0.51	0.80	23	

Christmas Presents

One of the following easy-to-read books published by the Department of Agriculture will prove a popular choice for Christmas for one of your friends or acquaintances:—

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- Pasture Production in New Zealand 2/6
- Farming in New Zealand. Volume I 8/6
- Primary Production in New Zealand 2/6
- Food and Health - - - - 1/6
- The Child and His Family - - 1/-
- Poultry Feeding - - - - 1/-
- Crop Production - - - - 2/-
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Care of the Boar

A good boar is a very valuable animal.

AS a good boar is a very valuable animal, far more valuable than many farmers seem to realise, he deserves the best of care and in this article I. H. Owtram, Extension Officer in Pig Husbandry, Department of Agriculture, Wellington, describes the care necessary to obtain best results from the boar.

THE farmer who produces pigs has either to breed them himself or buy them to fatten from someone who has bred them, but wherever they are bred a boar is still essential.

In New Zealand it will be some time before there is commercial use of artificial breeding of pigs. Today this is at the stage which artificial breeding of cattle had reached some 15 years ago. When the technical problems have been solved there is no doubt that artificial breeding will be of very great value to the New Zealand pig industry.

At present between 14,000 and 15,000 boars are in use on farms in the country and they represent not only a very considerable financial investment in the industry but also are of the greatest importance to the quality of the pork and bacon carcasses produced.

A boar that sires large litters of strong, healthy pigs that grow fast and make top-grade carcasses is a very valuable animal and should be kept as long as possible. The working life of a boar should be from 6 to 10 years if he is properly looked after.

Pedigree Animal Required

The boar should always be a pure-bred, pedigree animal. Pedigree pigs of all breeds have been bred for many generations from stock that have been carefully selected to produce the type of animal required by the market and that will impress on their offspring the qualities that they themselves are carrying. When a pedigree boar is bought it is always advisable to obtain a transfer with him. The cost of this is very small and many valuable animals have been lost to the industry through neglect to obtain the transfer. A young boar that is purchased may prove to be outstanding, and if his registration is not in order, his pedigree value is lost.

It is frequently not possible to buy a boar old enough for immediate use, as it is difficult for most pedigree breeders to keep on hand a supply of boars of serviceable age. This means that a young boar must be obtained and kept until he is fit to use. Boars should not be used until they are 8 months old and of at least 250lb. liveweight. As a result it is necessary to look ahead and obtain a new boar before disposing of the one he is to replace.

Care of Young Boar

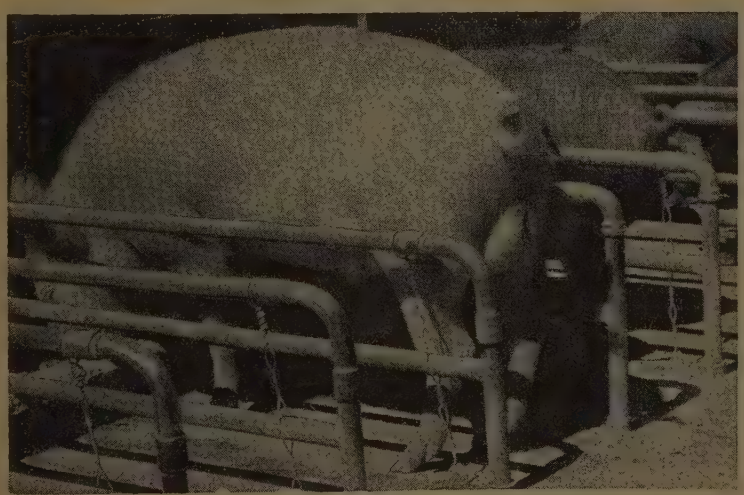
A young boar requires careful attention if he is to have a long and useful life. He must be well fed and should not be run with the dry sows and the boar he is to replace, as this will prevent him getting his share of the food and he will have to put up with much bullying from the bigger pigs. A good plan is to house the young boar with some barrows, as pigs are sociable animals and do not like solitary confinement.

A boar 6 months old is still growing fast and requires a certain amount of good food. He should not be overfed with skimmed milk or whey and should get from ½lb. to 1lb. of a good meal mixture every day. A good mixture would be one-third meat meal to two-thirds barley meal. Exercise is very important and the young boar should be run out on good pasture every day, except in very bad weather. This also is an opportunity to give him his meal ration, as the barrows with whom he is housed will of course not be getting any meal but will be fed on skimmed milk or whey alone.

Working the Boar

When a young boar is first used he must not be overworked and should not serve more than one or two sows a week. The first sows served should be young and not too big. If a young boar is faced with a large sow that he is unable to serve, he may become so discouraged that he will refuse to work at all. When this happens great difficulty is often experienced in getting him right again.

When a boar has settled down to his routine work he should be run with the in-pig sows. Feeding bails



The use of feeding bails makes it easy to keep the boar in the right condition.

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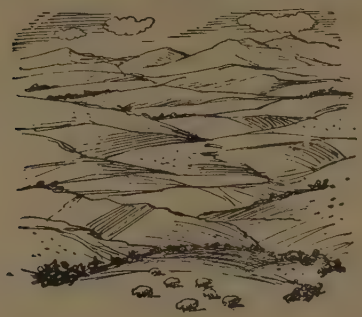

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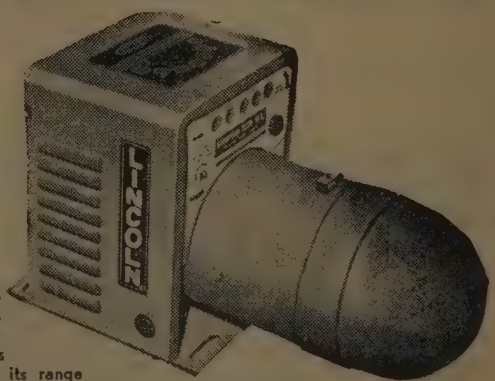

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WORLD'S LARGEST MANUFACTURERS OF ARC WELDING EQUIPMENT

are very useful in the management of the boar and sows, as the condition of the boar is very important. He must on no account be allowed to become fat, but must be kept in good, hard condition, and without feeding bails this is not easy. On a dairy farm work for a boar tends to be seasonal, as, in order to fit in the supply of pigs to the dairy by-products available, sows should farrow in May-June and again in November-December.

During the months in which no work is required of the boar his rations should be reduced to maintenance level. Two gallons of skimmed milk a day and good grazing are sufficient. However, it is advisable to increase his rations 3 or 4 weeks before he is required and to include a little meal (1lb. a day of the mixture mentioned earlier, namely one-third meat meal and two-thirds barley meal); 4 to 5 gallons of skimmed milk and the meal would be a suitable amount.

As exercise is very important, the boar should be given as much range as possible. All boars should be ringed with a copper ring through the septum (the division between the nostrils). These rings are like a small bullring and are easily obtainable and they should also be used for all breeding sows. Adult pigs ringed in this way can be allowed the run of the farm, as any fence in good order will keep them in.

Detusking

Boars should also be detusked. This generally needs doing for the first time at 18 months to 2 years of age. It is quite a simple job. The easiest way of holding the boar is to use two ropes (good plough line is ideal), one of which is used to tie one hind leg to a secure post and the other, by means of a slip knot round the upper jaw and snout, to tie the head to another post. Sufficient rope must be used to give the operator room to work. A convenient place to secure a boar is the corner of a paddock, the animal being tied across the corner to a post in each fenceline. The tusks can be removed quickly and efficiently with a bolt cutter and should be cut off just above the gum. The tusks in the lower jaw only are removed.

A good permanent house for the boar and dry sows, with feeding bails over the trough.

Sows on heat must not be run with the boar. Sows should be taken to the boar for service and removed afterward, one service being given 24 hours after the sow comes on heat and a second 24 hours later. The boar should be given at least 24 hours, preferably 48 hours, between the service of one sow and another, but the essential thing for maintaining fertility in the boar is good feed for a few weeks before and during the period when he is required to work.

Housing

Housing for the boar and dry sows need not be elaborate. Adult pigs are not nearly as susceptible to changes of temperature as young pigs. Their main requirements are that their sleeping quarters should be dry and draught proof. If a permanent house does not suit the layout of the farm, a semi-open-fronted movable house is quite adequate, as long as it is large enough for the boar and sows to lie down in comfort. A fully grown pig requires at least 12 to 16 sq. ft. of floor space in which to lie.

The saying that the boar is half the herd is very true. A good boar is a very valuable animal and should be carefully looked after. If he is properly fed, comfortably housed, and used with care, his useful life will be long and his owner will correspondingly benefit.

A suitable movable house.

Care of Livestock during December

Contributed by the Animal Research Division

CARE OF EWES AND FAT LAMBS

As each lot of lambs is sold their mothers and any dry ewes that may remain in the flock should be drafted off. If feed is short and the ewes have very little milk, it usually pays to wean all the lambs, which can then be given the best grazing available. The ewes should be shorn and those which are to be retained should be placed on short pasture with ample water until flushing is started 3 weeks before tupping. This will help to reduce their condition and will result in a better lambing percentage in the following season.

SHEARING

If ewes with lambs are to be shorn, every effort must be made to reduce the time during which lambs are away from the ewes, as it is easy to dry ewes off at this time of the year. They should be brought to the shed in small mobs and should be dagged before reaching the board.

FOOT-ROT CAN BE ERADICATED

This is the season in which plans for the eradication of foot-rot must be made and farmers should follow the recommendations in recent "Journal" articles on this subject.

DAIRY COW NUTRITION

The year's production can be materially affected by feed conditions during summer. Cows fed poorly now not only produce less milk during summer, but will dry off earlier in autumn. Dairy statistics show that long lactation is very important, so the feeding of silage or other supplementary milk-producing fodders should be started as soon as pasture begins to dry off. This should not be left until milk production shows a material fall.

Feeding of silage or other supplementary milk-producing fodders to dairy stock should be started as soon as pasture begins to dry off.

Newly weaned pigs should not be overfed; 1½ to 2 gallons of milk per day in three feeds is adequate for the first 14 days.

PIG PRODUCTION

Farrowed sows should receive a ration of 4 gallons of milk plus 2/3 gallon per pig suckled. Newly weaned pigs should not be overfed; 1½ to 2 gallons per day in three feeds is adequate for the first 14 days. The ration can then be slowly raised to 2½ gallons at the end of the first month, and after the first fortnight the number of feeds may be reduced to two per day.

Replacement breeding stock should be selected from the bacon pens. Those chosen should be the fastest-growing sows with good strong feet and at least 12 well-placed teats.

COWS RETURNING TO THE BULL

If cows are returning to service, the mating records should be examined to see if any particular bull is to blame. If so, a veterinarian or Livestock Instructor should collect a semen sample for examination. Care is necessary when a replacement bull is bought, and if possible it should be a young bull that has not been used previously. A bull should never be bought in the saleyard unless his full history is known. Washing out cows seldom helps and may cause trouble if irritant fluids such as kerosene are used. It pays to consult a veterinarian as soon as the cows are noticed returning to service in unusual numbers; he cannot be expected to diagnose the trouble months later.

FOWL POX

So-called roup is often fowl pox. Outbreaks of this disease can be prevented by vaccination, full details of which may be obtained from the nearest Poultry Instructor.

Pest Control and Pasture Management

Seasonal Notes by the Extension Division

DURING the last few years great progress has been made in the control of insects and other pests. Care is necessary, however, to ensure not only that the best results are secured at the lowest costs, but that useful insects are not harmed.

ARMY WORM IN CEREAL AND GRASS SEED CROPS

IN recent years the chance of damage by army worm to cereals and grass seed crops before harvesting seems to have increased. Affected areas should be treated as soon as damage appears. Control may be obtained by dusting or spraying with DDT or dieldrin. As sprays, DDT miscible oils at 2½ to 3 pints of 20 per cent. concentration per acre by air or ground application or dieldrin at 1 1/3 pints (ground application) or 1½ pints (by air) should be applied. DDT may be dusted on at 1lb. of 100 per cent. material per acre.

APHIDS IN BRASSICA CROPS

To control aphids in brassica crops intended for seed, treatment in autumn is recommended (or in winter if insects are accessible). The application of lindane at ¼lb. per acre as dust or spray by ground or air eliminates the overwintering generation of aphids that is responsible for the build up in numbers which causes the damage from August to the end of October.

CAUTION IN SPRAYING BRASSICA CROPS

Regulations now in force prohibit the application to cruciferous (brassica) and leguminous crops of sprays or dusts toxic to bees at the following times: From 1 September in any year to 31 March in the following year when the crop is in flower or when it contains flowering plants which attract bees in such quantity within the crop that application would be likely to damage or destroy foraging bees. Exemption from the prohibition may be given only by a permit issued by the Department of Agriculture.

—P. R. BARRER

* * *

BLACKBERRY CONTROL ON HILL COUNTRY

RECENT experience with 2,4,5-T in the control of blackberry has encouraged hill country farmers to tackle heavily infested areas with it. The application of the chemical on steep hill country is not cheap and care must be taken to see that it is used effectively. The following method has been used with very satisfactory results and at a reasonable cost in the Wairoa district, where blackberry is a really serious problem and where grazing by goats was previously the only method of control.

The areas to be treated are heavily stocked in winter and spring with sheep, cattle, and, if available, goats, the aim being to break down and clear away the heavy top growth of the blackberry. Stock are then removed and the regrowths allowed to come away until December and January, when the blackberry is sprayed thoroughly with 1.5lb. to 3lb. acid equivalent of 2,4,5-T in 250 gallons of water per acre. Pressures up to 200lb. are necessary for good coverage of the leaves and stems. The dead top growth is then burnt in March or early April and the area sown with a suitable grass seed mixture and topdressed. After the usual grazing of a young pasture during winter the stock are concentrated on the area during spring and early summer to deal with regrowths, any surviving this treatment being dealt with in summer by spot spraying.

—E. C. AYSON

* * *

HAYMAKING

THE making of really good meadow hay is generally tricky in the North Island, because pastures are at their best for this purpose well before satisfactory haymaking weather can be expected in many districts. Rain on the crop after it is cut reduces the feeding value, and prolonged wet weather can completely ruin the material for hay. On the other hand if bad weather delays the cutting after it is ready—that is, when the main grasses are just coming into flower—the quality of the hay falls off rapidly as the grasses mature. The best material from pastures for haymaking both in quantity and quality is produced during the spring flush of growth, which is ready for cutting in some districts in late October and in most districts during November.

In areas where reliable haymaking weather can be depended on at this time excellent hay can be made of this spring flush of growth, provided haymaking machines such as the swath turner, side-delivery rake, or tedder are used during drying to let the wind rather than the sun do the drying. Where the weather is unreliable, as in the higher-rainfall districts, it is best to make the first spring flush growth into silage and to shut paddocks which have been kept well grazed until early November or even later for hay. Such paddocks will generally produce a more clovery crop which will be ready to cut when the weather is more suitable for haymaking. Though the weather will be much warmer in late December and January, the cut material should not be left in the swath to be dried by the sun, but haymaking machinery should be used to let the air through it for drying.

—C. J. HAMBLYN

* * *

MANAGEMENT FOR RED CLOVER SEED PRODUCTION

ON red clover seed production areas the advantages and disadvantages of sowing pure red clover or a pasture mixture including red clover must be considered. Pure sowings may be favoured where red clover is handled as an annual crop, as in the northern part of the South Island, where under favourable climatic conditions cowgrass may be spring sown and harvested the following summer. Where areas are to remain in production for several seasons pure sowings cannot be recommended, as they very quickly become infested with Yorkshire fog, browntop, plantain, docks, and other weeds.

The more general practice is to sow red clover as a component of a normal pasture mixture which will provide maximum grazing in winter and early spring and, if well managed, will produce an excellent seed yield. Summer spelling for seed production favours cocksfoot dominance. Where repeated clover harvests are contemplated cocksfoot should not be sown. Other grasses, however, will provide valuable grazing and prevent rapid weed infestation.

Under favourable climatic conditions, particularly with cowgrass, an early cut of hay may be taken before the seed crop, but in southern districts Montgomery red clover areas should be grazed throughout spring. Closing dates will vary according to local conditions from early November in dry areas with restricted summer growth to early December in areas of higher summer rainfall, where earlier closing would normally result in excessive growth and lodging of the crop.

No general fertiliser recommendations can be made, but the correct fertiliser applied at closing time can increase yields substantially. On a foothill soil near Outram, Otago, an application of 3cwt. per acre of molybdenised DDT superphosphate has given outstanding results. Grass-grub and porina often cause severe damage, particularly to the associate grasses, in red clover seed crops, and where areas have not been treated previously fertiliser incorporating DDT should be applied at closing time when the pasture is closely grazed.

—S. M. J. STOCKDILL

Don't Cut Growing Trees to Make Christmas Trees

By A. M. W. GREIG,
Director, Horticulture Division, Department of Agriculture, Wellington

EVERY year in New Zealand the first Wednesday in August is celebrated as Arbor Day, when the importance and value of trees are recognised and emphasised. Special formal tree planting ceremonies also take place in many cities and towns. Most people admit that the planting of trees alone is not enough. Trees must be cared for and maintained and certainly not uprooted or cut down in their youth.

UNFORTUNATELY in this country the practice is rapidly extending of cutting down each year within a week or two of Christmas young pines or other coniferous trees to form decorated Christmas trees in homes over the festive season. The reckless cutting of young coniferous trees in plantations or shelter belts without the authority of the owner cannot be too strongly condemned.

The Royal New Zealand Institute of Horticulture has made a special study of the Christmas tree problem and has expressed its concern at the wanton cutting of young pine trees and mutilation of larger trees, especially close to cities. Each year, pines and related trees which have been planted for beautification or afforestation are cut off in their prime.

Overseas Attitude

In countries such as England, Holland, Denmark, Australia, and the United States the production of Christmas trees is regarded as an industry. People have developed the habit of obtaining their trees legitimately and there are markets which cater for this trade. In most instances private enterprises and State forests produce the trees and some local bodies have developed production schemes indirectly to guard their other plantings.

The Institute of Horticulture considers that the problem in New Zealand is a growing one and that some action should be taken in all cities. There are many forests in New Zealand owned and operated by the New Zealand Forest Service, by city councils and other local bodies, and by private companies and from these thinnings might be obtainable as Christmas trees. It is also the institute's opinion that on the poorer class of land Christmas tree farming could be profitable in this country if suitable species and cultural methods were used.

The institute seeks the good will of all tree lovers and emphasises that people should obtain their Christmas trees legitimately.

This can be done in several ways:—

First, by growing your own Christmas trees on your property or in tubs which can be brought inside over the festive season. Advice on this method appeared in the August issue of the "Journal" in an article, "Grow Your Own Christmas Trees".

Secondly, a plant nurseryman could be asked whether he has for sale any coniferous trees as Christmas trees this season.

Thirdly, inquiry could be made of a farmer or smallholder whether he has any trees for sale or distribution owing to the thinning out of a shelter belt or young plantation.

Fourthly, inquiries could be made at local offices of the New Zealand Forest Service about the availability of thinnings from their several plantations.

Finally, if trees cannot be secured legitimately, do not secure them illegitimately. Maintain the spirit of Arbor Day this Christmastide.

View of Fatal Tractor Accident

Tractor Drivers—

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Remember it is the accident that doesn't happen that saves lives.

Work in Woolshed is Responsibility of Sheep Owner

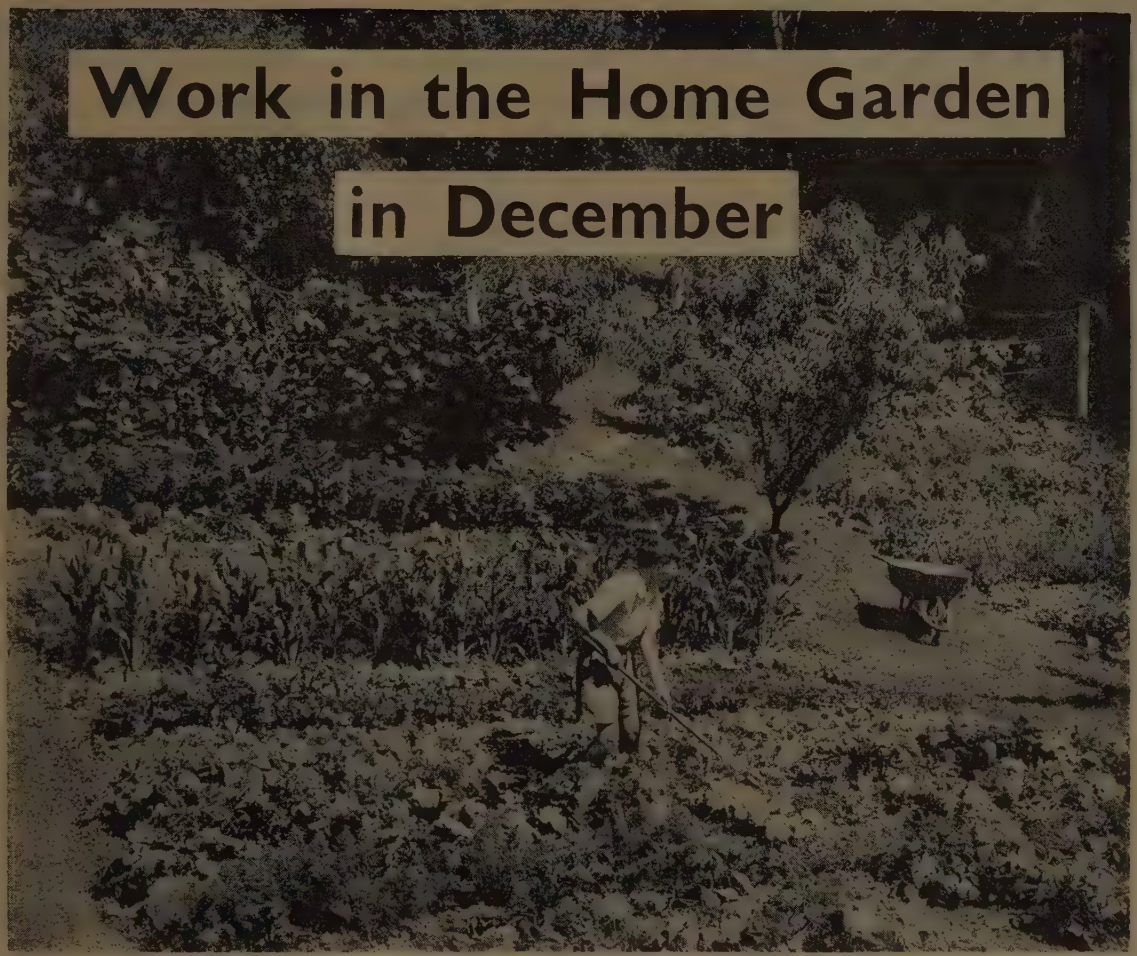
THE owner of the sheep or his representative is responsible for the work in a woolshed. Under the conditions of the shearers' and shed hands' award shearers and shed hands undertake to do a workmanlike job to the satisfaction of the owner or his agent. The award does not recognise a contractor.

Responsibility for payment of wages to shearers and shed hands rests on the owner. Should an owner pay a contractor and the contractor not pay his gang, the owner is still responsible for payment of wages, a principle that has been recognised when disputes have reached Court.

Shearers and shed hands should realise that they are responsible to the owner of the sheep and that in the event of a breach of the award they personally are responsible, not a contractor.

—R. G. MONTGOMERY,
Sheep and Wool Instructor,
Department of Agriculture,
Hastings

Work in the Home Garden in December



By A. G. KENNELLY,
Horticultural Instructor, Department of Agriculture, Dunedin

WHERE soil conditions are good there should be vigorous growth in the garden in December. However, weeds as well as vegetables make strong growth and the hoe should be kept sharp and used regularly between rows. Except in the warmer districts, which can expect to have a long, comparatively mild period during late autumn and early winter, the work of ground preparation for, or planting out of, winter greens should be high on the list of jobs for late December.

IN most districts the period from late December to the end of January is the best time for setting out savoy cabbage, winter cauliflower, or broccoli, brussels sprouts, and fine-leaved kale or borecole. The killing of weeds among established crops is very important, as weeds deprive crop plants of food and moisture and are often the means by which insect pests and diseases are carried over from season to season. Many new weedkillers effective for certain crops have been developed in recent years, but in the home garden hoeing is usually still the most effective way of controlling weeds among crops.

The pulling of main-crop rhubarb should be discontinued early in the month, particularly where conditions are dry. Successional sowings may be made of most vegetables, particularly the salad crops, and swedes and peas can be sown if a supply of moisture can be assured. Parsnips can still be sown, though it is rather late for this in some southern districts unless growing conditions are good.

Liquid manure can be applied with advantage to most crops in ground lacking plant food, and where necessary watering should be attended to. The supply of water is particularly important to the growth and setting of beans and the growth of lettuce and celery.

Where broad beans are attacked by the fungous disease known as rust, they should be sprayed with zineb regularly. Rust is readily recognised by the rusty pustules which develop and should not be confused with chocolate spot, a fungous disease which causes chocolate-coloured blotches on the leaves.

Tall tomatoes need pruning, staking, tying, and, except in some southern districts, spraying with DDT against caterpillars and with bordeaux mixture, copper oxychloride, or other suitable Government-certified therapeutant to control fungous disease.

Harvesting Asparagus

In harvesting asparagus shoots care should be taken not to exhaust the crowns. Too heavy cutting will reduce subsequent yields and many beds have been ruined in this way. The usual method of harvesting is to cut the shoots or spears a little below the

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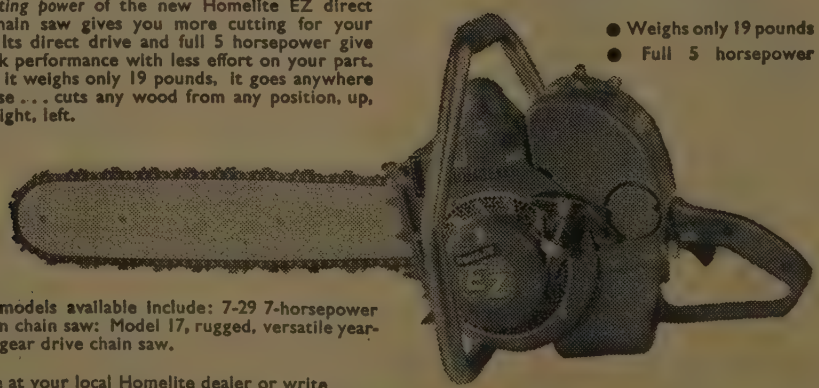

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ground surface with a sharp knife or asparagus cutter.

It is safe to cut half as deep as the top of the crown is below the ground; if the crown is about 4in. to 5in. down, the spears should be cut about 2in. below the surface. Cutting is usually begun when the spears are 6in. to 8in. above the ground. The spear is first gently pulled so that its position can be determined and, if the operator is experienced, it can be cut with a single thrust without causing damage to other spears. In loose soil spears can be broken off by bending them with the hand, but this method may cause the spear to break too deeply and damage the crown.

The butts of spears are usually fibrous and should be trimmed off before use, though the pieces can be used for flavouring soup. Cutting should cease early where conditions are dry or if the soil is poor.

Beans

Climbing beans can be grown in rows without staking by slashing or pinching back excessively long growths, but where growing conditions are favourable best results are obtained if beans are staked or allowed to climb a support.

For supporting runner beans a double row of arched 8ft. stakes is satisfactory or they can be supported by wires (in a fence system) with strings or pea sticks running vertically from the wires. A third method is to use groups of 3 or 4 stakes of 8ft. or longer placed firmly in the ground 18in. to 24in. apart and inclining toward each other so that they can be tied at a point near the top.

Red mites or red spiders commonly attack beans. The adult mites are very small, from 1/15in. to 1/25in. long. They are difficult to see with the unaided eye, particularly early in the season, when they are usually greenish, though they may be pale yellowish or cream with a large green spot on each side of the body. Later in autumn they usually turn red. They spin fine webs on the undersides of the leaves, which they rasp, denuding them of green matter so that the leaves take on a silvered appearance.

An important aspect of the control of red mites is to destroy weeds on which the mites feed and multiply and on which they are carried over from one crop to another. Red mites can be controlled by summer oil, sprayed at ½ pint to 4 gallons of water, or chlorobenzide wettable powder preparations used according to the manufacturer's recommendations.

Celery

Though it is useful for soups and stews, celery is most popular as a salad vegetable. Most home gardeners like to set out plants as early as possible and though plants can be set out earlier where temperatures are high enough, December and January are the preferred months for planting. Later planting is satisfactory only where autumns are mild enough for the completion of growth.

Home gardeners sometimes defer planting until after the Christmas holidays so that they can attend to the plants throughout their growing period, because for good growth celery should have a continuous and fairly high supply of moisture and because in most districts regular spraying is necessary to keep the plants free from leaf diseases. However, for self-blanching varieties, temperatures are of first importance. If they are not high enough during the seedling stage, plants will fail.

Home gardeners usually buy young celery plants from seedsmen or nurserymen, as the seedlings of self-blanching celery need to be raised in consistently higher temperatures than prevail in most districts without the aid of a glasshouse or heated frame. Most varieties of self-blanching celery begin to develop seed stalks if they are subjected for a week or more to temperatures of 35 to 50 degrees F.

Manures

Though self-blanching celery is more tolerant in the seedling stage of insufficiencies of moisture, nutrients, light, and space than it is of low temperatures, a good deal of skill is needed to grow it well, as it needs a rich soil, ample moisture, and good drainage. Organic manure such as farmyard manure or blood and bone are preferred, but where organic manures are not available in sufficient quantity it is usual to supplement them with mineral fertilisers. Nitrogenous and phosphatic fertilisers are usually applied and give improved growth on most soils. Potash is less often applied, though probably it would improve the quality of celery on many soils.

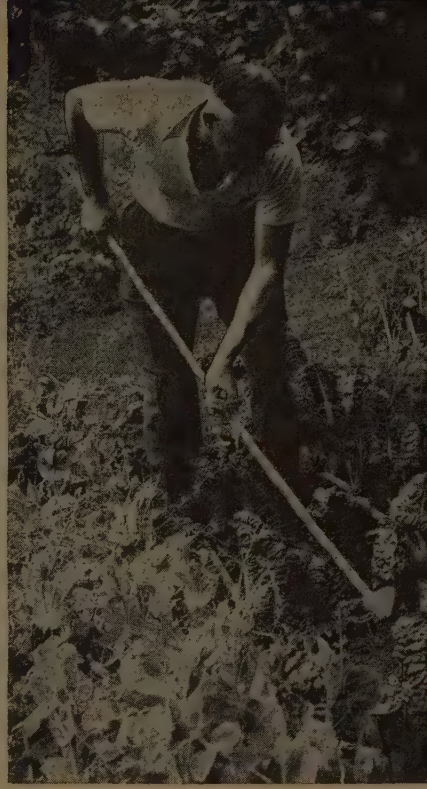
A complete and balanced fertiliser made up of 2½ parts of sulphate of ammonia, 2½ parts of superphosphate, and 1 part of sulphate of potash applied at about 2oz. to 4oz. to the square yard according to soil fertility should promote good growth. Manure should be mixed into the top few inches of the soil before the plants are set out; deep placement is not advisable, as the roots of celery remain near the surface.

Soil moisture is as important as soil nutrients in the growing of celery. To facilitate watering in soils that may dry out plants can be grown in shallow trenches.

Non-self-blanching Types

The types of celery which are not self-blanching are usually considered less difficult to grow than the self-blanching types and are considered by many to have a superior flavour and texture. A well-grown head of celery should be made up solidly of large, thick-fleshed, succulent leaf stalks, and the characteristic celery flavour should be strongly developed.

Planting in a trench is specially favoured by those who blanch the older, non-self-blanching varieties by moulding the earth up the stems, but it is practicable only where the soil is deep and well drained and does not contain too much organic matter. Non-self-blanching celery is less subject to leaf spot disease than are self-blanching kinds.



The hoe must be kept going if weeds are to be kept down among growing crops.

Spraying

Where leaf-spot disease is prevalent plants should be sprayed with a fungicide, such as zineb, nabam, captan, or a copper preparation such as bordeaux mixture or copper oxychloride at intervals of about 7 to 14 days. Control of the disease may be obtained with less frequent spraying where humidity is low or a good coverage of spray residue remains on the plants for a fairly long time.

Cucurbits

Trailing leaders of cucurbits (marrows, pumpkins, cucumbers, and melons) should be stopped (pinched off) to encourage the growth of laterals and to keep plants within bounds. Cucumbers should not be left on the vines after they reach maturity or the flavour is likely to become bitter.

Cucurbits grow quickly in warm conditions if the soil is fertile and

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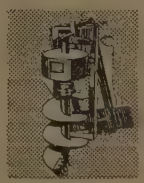

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friable. A sufficiently high soil temperature is very important, as they make little growth in soil temperatures below 50 degrees F. Light soils that have been well mulched or have had plenty of organic matter worked into them are excellent for these crops if moisture is adequate and drainage is good.

Cucumbers are more tender than tomatoes or sweet corn and as the leaves are readily scorched by sun or wind in exposed situations, they should preferably be grown between rows of taller plants such as peas or sweet corn, which will provide some shelter.

Cucurbits are usually grown either on hills in groups of several plants set fairly closely together, in single rows, or in large gardens occasionally in double rows. Only shallow hoeing round the vines should now be necessary and if this is done regularly, weeds will be destroyed when they are small.

Except where the soil is very fertile the yield is usually improved by a topdressing of sulphate of ammonia or blood and bone. Where conditions are dry the manure can be applied in liquid form, either made from animal manure or sulphate of ammonia at 1oz. in about 2 gallons of water.

Kumaras

Kumara runners should be lifted periodically to prevent them from rooting. If they are lifted regularly, the vines will not mat together and are much easier to turn. Kumaras are grown commercially only in the northern parts of New Zealand, but in some seasons they will succeed in warm, sheltered areas as far south as Christchurch.

Leeks

Though leeks can be set out earlier and (in districts where autumn and early winter are sufficiently mild to enable the plants to reach maturity) later than December and January, these are the preferred months for planting. A good plan is to have two or more plantings. In most districts an early, a mid-season, and a late planting will ensure a supply of leeks from autumn until late spring.

Leeks are a great standby and are very easily grown. They are rarely affected by insect pests or disease, and though cabbage and cauliflower (or broccoli) mature according to their season and are available or in best condition only then, leeks stand well and may be used over many months.

Plants can be set out 6in. to 8in. apart in rows 12in. apart. A trench 3in. to 4in. deep can be drawn out with a hoe and holes made with a dibble somewhat deeper than the white portion of the plants to be set out. Plants can then be dropped in the holes and left with portion of the green tops (the long ends of which may be cut off) protruding. If the plants are watered, it will not be necessary to fill the holes, as the soil will gradually erode and fill them. Where the soil is heavy and sticky the holes should be made with a trowel, as a dibble will consolidate it too much.

[*Sparrow*

Rhubarb should not be harvested for too long each season. It is important to allow the plants to make growth to enable them to recover from heavy harvesting of the stalks.

Soil for leeks should preferably be rich in organic manure, but where the water-table is sufficiently high excellent crops can be grown with artificial fertilisers alone. A complete fertiliser (one rich in nitrogen, phosphate, and potash) should be applied and thoroughly incorporated throughout the bed at 3oz. to 4oz. per square yard.

Varieties include London or Broad Flag, which is best grown for early use; Musselburgh, which is a very hardy variety usually characterised by its long, blanched stem; and Lyon, which is generally similar to London, but grows larger and is slower maturing. Lyon is a good variety for a late crop, as it is slow in running to seed.

Lettuces

In December lettuces are best sown in a situation where the crop is to mature. Though lettuces transplant readily, their ability to withstand transplanting varies with conditions. When conditions are good, damaged and destroyed roots are normally replaced quickly by new growth. In December, when conditions are often dry, transplanting is likely to check plants severely even if the work is done with the greatest care.

During the warmer part of the year lettuces are grown in practically all home gardens, and with successional sowing or planting they can be grown in most districts to be available throughout the year. Plants must be grown quickly if the leaves are to be crisp. Slow growth or checks to growth cause the flavour to be bitter, and though varieties of lettuce have been developed that have considerable tolerance to hot weather, high-quality lettuce can be produced consistently only where the temperature of the soil and the air is moderately cool while the crop is maturing. Fluctuating high and low temperatures do not permit good growth. With most varieties high temperatures tend to give early seed head development, bitter flavour, and poor hearts.

Lettuces mature in from about 2 to 5 months according to growing conditions and varieties, but conditions have to be exceptionally favourable to produce good lettuces in 2 months.

Good varieties for sowing in December include Great Lakes, Matador, Pennlake, Summer Gem, and Imperial 847.

Manuring

The root systems of lettuce are relatively shallow. Though excess water is not desirable, plants should be set out in a moist soil that does not dry out. Practically all soils are improved for lettuce growing by the addition of organic matter. The amount needed varies with the soil type. Loss of

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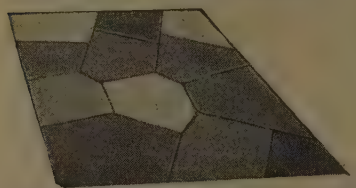

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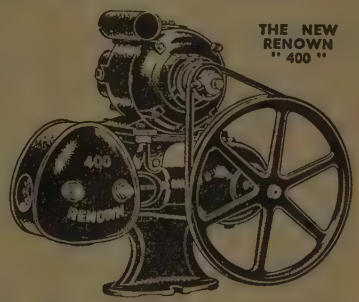

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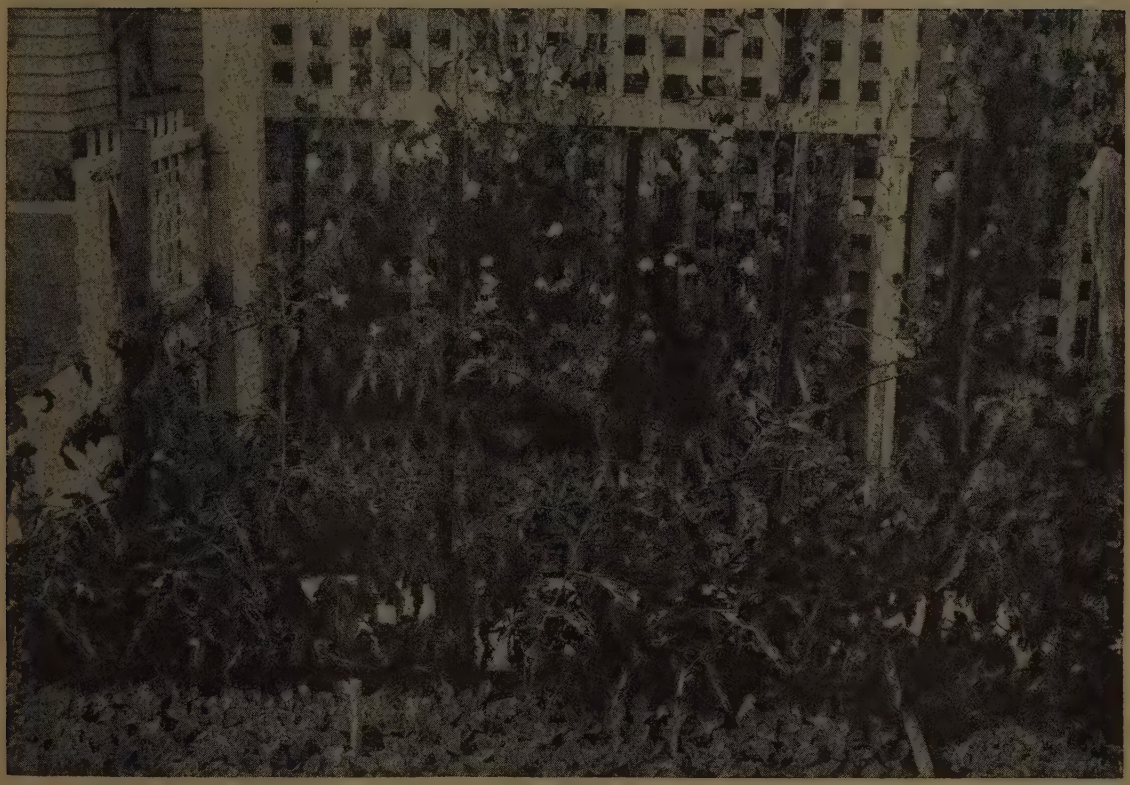

[*Green and Hahn*

Most crops mature earlier if given a sunny situation and good shelter such as that provided for tomatoes here by a trellis covered by sweet peas.

organic matter owing to decomposition is rapid in light soils, but heavy soils also need organic matter, as it improves aeration and water movement.

Well-rotted farmyard manure gives excellent results, but very heavy dressings, particularly when the weather is most favourable for growth, may result in loose heads. Where sufficient farmyard manure, compost, or similar material cannot be obtained soil can be improved by growing a green manure crop and digging it in early enough for it to rot down before the lettuce is set out.

Unless rotting is fairly complete before the plants are set out growth may be checked through depletion of the nitrogen in the soil by the bacteria that cause decomposition. On very heavy soils, where the danger of depletion of the nitrogen supply may be outweighed by the advantage of improving the physical condition of the soil, it may be advisable to allow the green crop to mature fully before digging it in. A mature crop contains more fibre than an immature crop and when incorporated into the soil is likely to be effective for longer.

If additional fertiliser is needed, blood and bone is likely to give good results on most soils. Alternatively a so-called complete mineral fertiliser can be made by mixing 2½ parts of sulphate of ammonia, 2½ parts of superphosphate, and 1 part of sulphate of potash. The complete fertiliser is much more concentrated than blood and bone and it can be applied at about half the rate.

Application can vary from about 2oz. to 6oz. to the square yard according to the fertiliser and the fertility of the soil. In home gardens a manure which is rich in nitrogen is usually needed for lettuces. However, too much nitrogen may result in poor hearts and loose leaves.

Sowing

Soil should be worked to a fine tilth for sowing, as a lettuce seed is small and germination is relatively weak. Seeds should be sown thinly about ¼in. deep in rows 12in. to 15in. apart. The first thinning should leave plants about 6in. apart.

New Zealand Spinach

New Zealand spinach is not a true spinach, but is useful in hot, dry, sunny situations and is often preferred because it lacks the peculiar bitterness of true spinach. It is a half-hardy trailing annual with large, succulent leaves and is very useful to provide autumn greens from a December sowing.

Growth is rapid in favourable conditions and it responds best to a light, fertile soil in a sunny position with adequate moisture. It is harvested by pinching off about 3in. of the growing tips, which forces new shoots to develop, so that when established the plant has a multitude of tips for gathering.

New Zealand spinach plants spread over quite a large area and should be given a spacing of at least 2ft. each way. Seed, which usually germinates slowly, should be sown 1in. to 1½in. deep; 2 or 3 seeds should be sown together at each spacing and the weaker plants removed after establishment. Plants mature in about 6 to 8 weeks.

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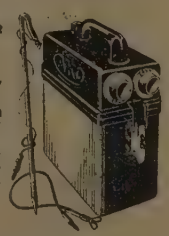

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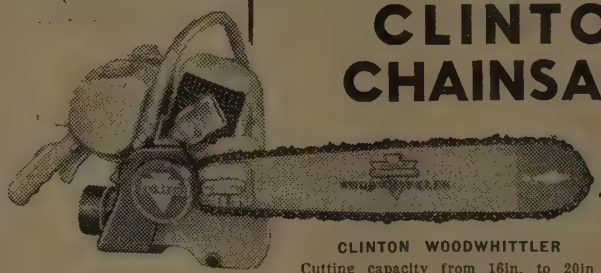

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Winter Greens

Choice of varieties of winter cauliflower or broccoli, savoy cabbage, and kale is important. Varieties of winter cauliflower or broccoli can be bought which will mature at different periods so that, if suitable varieties are chosen, a succession of heads for cutting can be had from early autumn until late spring; the latest savoy cabbage is usually mature by August.

Kales and sprouting broccolis are most useful during late winter or early spring, when other green crops are often in short supply, but discrimination is needed in choosing the better sorts of kale. Some varieties of leaf kale have tough leaves with a strong, sometimes rather harsh flavour. The finer-leafed sorts should be grown in the home garden. Asparagus kale and sprouting broccoli are well worth a trial as they are nutritious and some varieties have a delicate flavour and compare favourably in texture and flavour with the finest of green vegetables.

Soil for winter greens should be deep, rich, and well drained and should contain plenty of organic matter. Most members of the cabbage family succeed in a great variety of soils if there is adequate plant food and moisture and drainage is satisfactory. Most members of the cabbage family have very strong root systems. The roots recover well from injury during transplanting.

Soil and Manure

Heavier soils are preferable for winter greens, because they retain moisture better and are likely to be richer in plant foods, but light soils are often more suitable for early crops. Rotation of crops is important where members of the cabbage family are grown, and heavy dressings of organic material such as compost, well-rotted stack bottom, and farmyard, stable, or poultry manure are desirable on most soils.

Where organic manures are not available a green crop should be dug in, and, except where the soil is very rich, the green crop or organic manure should be supplemented with a fertiliser at 2oz. to 5oz. per square yard. A fertiliser having a 1 : 2 (or 3) : 1 ratio of nitrogen, phosphate, and potash will generally give good results. Additional side dressings of nitrogenous manures such as nitrate of soda or sulphate of ammonia are often advisable, particularly where the organic matter applied to the soil is of strawy rather than sappy or well rotted and when quick, forced growth is required, as in early spring.

Care should be taken not to apply too much nitrogenous manure in relation to phosphatic and potassic manure or the resulting soft growth will be easily damaged by frost, insects, and secondary rots. Potash is regarded as of particular value for hardening and giving texture to winter-grown brassicas. Where a complete fertiliser is not applied additional phosphate (best applied by a dressing of superphosphate) is advisable when farmyard or stable manure is applied, as such materials are low in phosphates.

Though drainage, temperature, moisture, and manure placement are very important, the ultimate weight of the winter greens crop is greatly influenced by the amount of plant food available.

[*Green and Hahn*

Curly kale can be set out in most districts in December and January to provide winter greens. Only the finest strains should be grown in the home garden.

Lime

Annual dressings of lime at 2oz. to 4oz. per square yard are advisable on most soils, though more may be necessary in high-rainfall districts. Plants such as cabbages and cauliflowers are not especially sensitive to soil acidity, but they grow well in nearly neutral or slightly alkaline soil. Apart from giving the pH level (degree of acidity) of the soil that ensures good growth, liming by making the soil more alkaline tends to inhibit the disease club root.

Though popular, the rotation of cabbage or cauliflower and potatoes should be avoided where the diseases club root and potato scab are troublesome, as liming inhibits the development of club root but favours the development of potato scab; acid soils tend to inhibit scab, but favour club root.

Planting

Home gardeners often remove plants from the seed-bed and set them out when they are very small. This practice is advisable only if the conditions are favourable. Plants should be sturdy, close jointed, hardy, and well developed and should be lifted with a fibrous tuft of soil and roots.

In the home garden, where there is usually no delay between lifting and setting out the plants, it should not be necessary to puddle the roots in thick muddy water to keep them moist, as is often done under commercial conditions. When the plants are lifted the top growth can be dipped in a solution of lindane or nicotine sulphate and DDT if aphids and caterpillars are troublesome.

Planting should be done with a trowel, as the plants may not develop properly if the taproot is bent up, as often happens when they are planted with a dibble. If dry, plants in the seed-bed should be watered thoroughly the night before they are lifted.

THE HOME GARDEN . . .

Blind plants (those with no growing points) or very weak plants should be discarded. It is usually considered that plants with bent or coarse, thick taproots develop better if about 1in. is cut from the root end. Rows should be 24in. to 30in. apart and plants 18in. to 24in. apart in the rows, according to the size of the variety.

Varieties of broccoli or winter cauliflower, brussels sprouts, kale, and savoy cabbage should be chosen to mature in succession.

Examples of varieties of broccoli which mature successionally are: American No. 1, which produces heads in June and July, American No. 2, heading in August and September, and American No. 3, heading during September and October. Other examples are Winter Mammoth, maturing in mid-winter, Superb Winter White, maturing in June, July, and sometimes in August, Lily White, maturing in July and August, St. Valentine, maturing in August and September, and Late White, maturing in spring. The maturity dates given are only approximate and may vary with the strain of the variety, the district, and the season.

Non-heading varieties of broccoli include Italian Green Sprouting (Calabrese), Early Purple Sprouting, Late Purple Sprouting, and White Sprouting. Varieties of kale or borecole include fine-leafed sorts which may mature early or late and asparagus kale. Varieties of brussels sprouts include: Early, Cambridge No. 1 and Harrison's XXX, both of medium habit with large sprouts; main crop, Evesham's Special, a tall variety with medium sprouts, Evesham's Selected, a medium variety with large sprouts, and Covent Garden and Ormskirk Giant, tall varieties with large sprouts; late, Cambridge No. 5 and Scrymger's Giant, both large varieties with large sprouts.

Varieties of savoy cabbage are available to mature from early autumn to about the end of August.

A good early variety is Best of All, which can be followed by Drumhead Savoy, Omega, Rearguard, and Ormskirk Late in that order.

Radio Broadcasts for Farmers during December

RADIO broadcasts for farmers will be given during December as follows:—

1YZ Rotorua, 7.15 p.m.

11 December—"Topical Farming Notes", by S. W. Hewitt, Instructor in Agriculture, Department of Agriculture, Whakatane.

2XA Wanganui, 8 p.m.

5 December—"For the Country Woman", by Mary MacDonald.

12 December—"The Radio Vet.", by S. Jamieson, Veterinarian, Department of Agriculture, Wanganui.

19 December—"Control of Foot-rot in Sheep", by A. J. White, Livestock Instructor, Department of Agriculture, Wanganui.

2ZA Palmerston North, 12.33 p.m.

2 December—"Abortion in Cattle", by H. O. Mackley, Livestock Instructor, Department of Agriculture, Feilding.

9 December—"Early Weaning and Its Relationship to Summer Pasture Management", by F. G. Spite, Instructor in Agriculture, Department of Agriculture, Masterton.

16 December—"Control of Household and Store Pests", by T. N. Flint, Plant Quarantine Officer, Department of Agriculture, Palmerston North.

23 December—"Abnormal Growth", by A. V. Lithgow, Officer in Charge, Seed-testing Station, Department of Agriculture, Palmerston North.

30 December—"The Purpose of Field Drainage", by K. L. Mayo, Instructor in Agriculture (Farm Drainage), Department of Agriculture, Palmerston North.

2YZ Napier, 7.10 p.m.

3 December—"Cooling of Milk and Cream", by L. W. Scott, Farm Dairy Instructor, Department of Agriculture, Hastings.

17 December—"Summary of Year's Work", by R. G. Montgomery, Sheep and Wool Instructor, Department of Agriculture, Hastings.

3YA Christchurch, 12.20 p.m.

2 December—"Fruit Tree Pests and Disease Control", by G. F. Thiele, Horticultural Instructor, Department of Agriculture, Christchurch.

16 December—"Review of 'The New Zealand Journal of Agriculture' " (December issue), by E. G. Smith, Instructor in Agriculture, Department of Agriculture, Rangiora.

4YA Dunedin and 4YZ Invercargill, 12.33 p.m.

2 December—"Seed Harvest", by T. L. Reid, Fields Instructor, Department of Agriculture, Gore.

4 December—"The South Taranaki Farm Improvement Club", by A. W. Pantall, technical farm adviser.

9 December—"Sulphur Investigations", by R. K. Darwin, Instructor in Agriculture, Department of Agriculture, Oamaru.

11 December—"Soil Chemistry and the Farmer", by E. B. Davies, Senior Chemist, Department of Agriculture Rukuhia Soil Research Station.

16 December—"Pros and Cons of Drenching", by C. E. Isaacs, Veterinarian, Department of Agriculture, Invercargill.

17 December—"Review of 1957", by A. G. Elliott, Fields Superintendent, and D. H. Le Souef, Livestock Superintendent, Department of Agriculture, Dunedin.

18 December—"Feeding Your Way out of Trouble", by I. H. Owtram, Extension Officer in Pig Husbandry, Department of Agriculture, Wellington.

4YZ Invercargill (following joint programme from 4YA and 4YZ)

2 December—"Honey Marketing Problems", by D. W. A. Seal, Apiary Instructor, Department of Agriculture, Invercargill.

9 December—"Dairy Hygiene", by H. A. McIntosh, Dairy Instructor, Department of Agriculture, Invercargill.

16 December—"Co-operative Trials with Farmers", by A. R. Rankin, Fields Instructor, Department of Agriculture, Invercargill.

Regular Sessions

1XH Hamilton, Mondays at 12.33 p.m. and Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (stock sale review).

1XN Whangarei, Mondays at 8 p.m. (Northland livestock report and "Farming for Profit"), Wednesdays at 8 p.m. ("Farming for Profit"), and Fridays at 8 p.m. ("News for the Farmer").

1YA Auckland, Mondays at 12.33 p.m., Tuesdays, Wednesdays, and Thursdays at 7.45 p.m., and Fridays at 6 p.m. and 7.45 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock market review), Tuesdays at 7 p.m. (Hamilton stock market report), Wednesdays at 7.15 p.m. (Pig Council talk on fourth Wednesday of every other month at 12.33 p.m.), Thursdays at 12.33 p.m.

2XA Wanganui, Wednesdays at 8 p.m. (Wanganui stock sale report), Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m., Fridays at 8.2 p.m. (Gisborne stock market report).

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8.1 p.m.

2YA Wellington, Mondays at 7.15 p.m., Thursdays at 12.33 p.m., Fridays at 7 p.m. (Feilding stock market report).

2YZ Napier, Tuesdays at 12.12 p.m. (Hawke's Bay orchardist session), Tuesdays at 7.10 p.m., Wednesdays at 7.15 p.m. (Hawke's Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

3XC Timaru, Mondays at 8 p.m. (Pleasant Point stock market report), Tuesdays (fortnightly) at 8 p.m. (Temuka stock market report), Wednesdays at 8 p.m., and Saturdays at 10.30 a.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Mondays and Thursdays at 12.33 p.m.

4YA Dunedin, Mondays at 12.33 p.m., Tuesdays at 12.33 p.m., Wednesdays at 12.33 p.m. and 6.50 p.m. (Burnside stock market report), Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m., Tuesdays at 12.33 p.m. and 7.15 p.m. (Lorneville and Gore stock market reports), Wednesdays at 12.33 p.m., and Thursdays at 12.33 p.m.

Main Wool Sales

The dates and venues of main wool sales until the end of March are:—

18 and 20 November: Napier.
25 November: Wellington.
4 December: Christchurch.
9 December: Invercargill.
14 December: Dunedin.
18 December: Timaru.
10 January: Wanganui.
15 and 17 January: Auckland.
22 and 24 January: Napier.
29 and 31 January: Wellington.
12 and 14 February: Christchurch.
19 and 21 February: Invercargill.
26 and 28 February: Dunedin.
5 March: Timaru.
14 March: Wanganui.
19 and 21 March: Auckland.
26 and 28 March: Napier.

Developments in Silage Making

By B. T. JORDAN,
Instructor in Agriculture,
Department of Agriculture,
Tauranga

THOUGH much has already been written on silage making, a summary of the results obtained from the use of the different machines developed in recent years for handling silage may be useful to farmers seeking information on latest developments.

A tractor should always be backed up a wedge. If it is driven forward, it may strike a lump, skid, and overturn.

The correct method of picking up with the buckrake is to work in the same direction as did the mower.

This badly built wedge has a large overhang. The end should be straight or slope back slightly to keep it tight.

▼ It is wrong to pick up against the direction of mowing, as it leaves an unclean paddock and the job is unsatisfactory.

THE most extensively used of all the newer equipment is the buckrake. Now a common implement in dairying districts, its application has made silage making increasingly popular. The buckrake is used not only for silage, but also for carting out posts, milk cans, and other farm equipment.

The Buckrake

Much has been learnt about using the buckrake and many farmers have had to find out the best methods of use by trial and error. Surprisingly, many operators do not know that the

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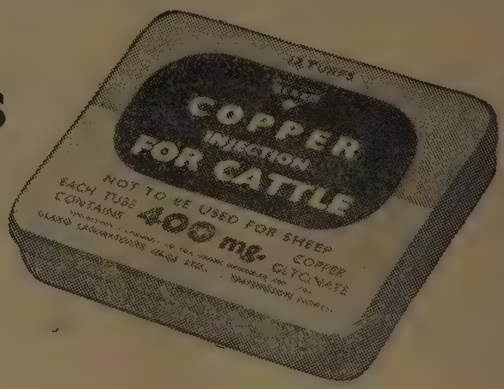

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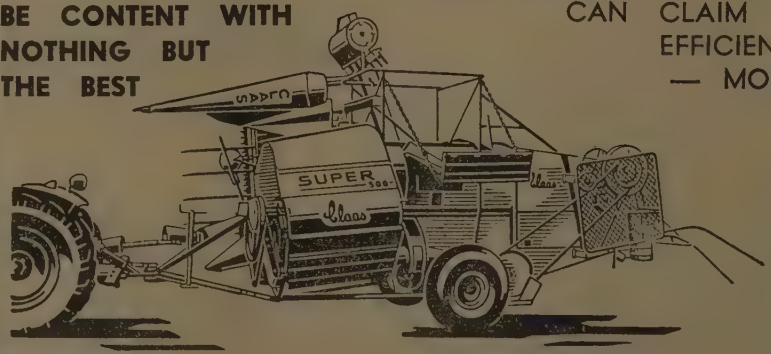

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Left—The correct way to dump a buckrake on a wedge. Buckraking is much easier if the wedge is built on a slope, a method which gives a greater depth of material in a short distance. Right—Regular rolling during the day is advisable and will facilitate the use of the buckrake, as it tends to level out some of the bumps which give trouble when a buckrake is being backed with a load. Consolidation is of course necessary to prevent overheating, and if the temperature rises too high overnight, the stack should be well rolled before more material is added.

best and cleanest way to pick up with the buckrake from the swath is to go the same way as the mower did when cutting the crop.

Many makes of buckrake are available, but only those with short teeth and without cross-bar supports have been found able to carry really large loads, up to the capacity of the tractor.

Some farmers with tractors that have a fast reverse gear have found it quicker to sweep in backward with the rake on the ground and then to split the load to put it on the stack or wedge being made. This is inclined to roll the material, but it reduces transport time considerably and speeds up the harvest.

The Front-end Loader

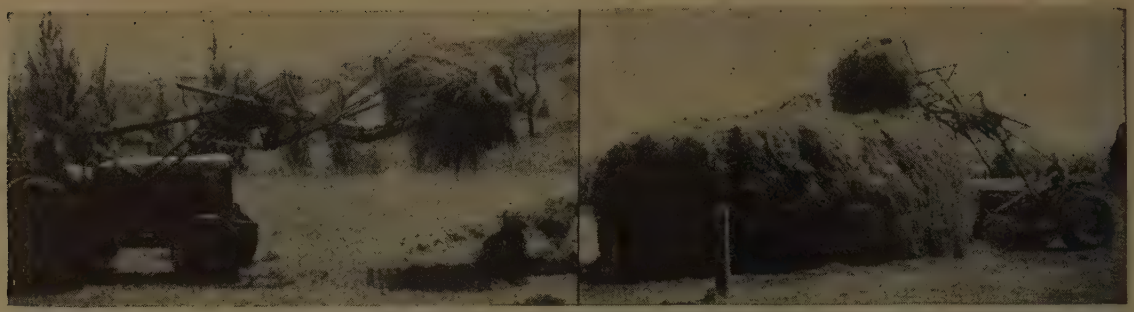
Because of their much greater expense, there are not as many front-end loaders on farms as there are buckrakes; however, their use does seem warranted in filling silos or making stacks. They can lift large quantities to considerable heights. This machine too can push in more than it can lift and it is advisable to divide the load before lifting.

The Silorator and Forage Harvester

The silorator and forage harvester are similar machines in that they both need either trucks or trailers to cart the green material to the stack, trench, pit, or other storage place. However, they have many good points. The material is chopped small and bruised to enable good consolidation. Either machine lifts the grass from the ground and deposits it in the truck or trailer. An additional advantage is that they can be used very successfully for topping pastures.

The bun is a safe and satisfactory method of conserving material where a low-clearance tractor is used. It is easy to consolidate over the entire surface. Though some people suggest that it wastes ground because of its large base, the surrounding fence can be put to the edge of the stack and so save paddock space.

A run-through trench provides a very good method for storing silage for farmers who have country suitable for trenches. The width of the trench should be twice that of the tractor so that maximum consolidation is assured. It is a good idea also to leave the floor of the trench crowned so that seepage will drain to the edges and so that the top of the stack will be crowned even when the stack sinks.



Left—A front-end loader splitting its load to lift on to a stack after sweeping material into a large heap. Right—A loader building a stack. The loader can approach from all sides, which makes stacking easy. Stacks are of advantage for feeding out.

Baling

Baling of silage has also been tried with success. To handle green material with a baler the size of the bale must be reduced to half that of a hay bale, and to secure good consolidation it is best if the bales are stacked in a pit or trench. Because the material is baled, many farmers forget to consolidate it, even though it is just as necessary as in a wedge, clamp, or other stack. The tractor should roll the bales and a layer of loose grass should be spread over every second layer. If strings do not come in contact with the bare earth, they will remain solid and lasting.

Though the bales are slack when the time comes to feed them out, they can still be handled with ease and placed on a trailer, making feeding out quite speedy. At present the major drawback is the cost of baling and carting the bales to the pit or trench.

Agricultural and Pastoral Show Dates

THE following are dates and venues of A. and P. shows up to the end of March:—

NORTH ISLAND

November

15 and 16 November—Wanganui A. and P. at Wanganui.
*16 November—Bay of Islands P. and I. at Waimate North.
16 November—Waihi A. and P. at Waihi.
22 and 23 November—Rotorua A. and P. at Rotorua.
22 and 23 November—Egmont A. and P. at Hawera.
28, 29, and 30 November—Auckland A. and P. at Auckland.
29 and 30 November—Stratford A. and P. at Stratford.

December

*7 December—Helensville A. and P. at Helensville.
7 December—Kaikohe A., P., and H. at Kaikohe.
7 December—Hauraki A. and P. at Paeroa.

January

1 January—Nuhaka A. and P. at Nuhaka.
17 and 18 January—Feilding I., A., and P. at Feilding.
*17 and 18 January—Wairoa County A. and P. at Wairoa.
24 and 25 January—Horowhenua A. and P. at Levin.
25 January—Central Hawke's Bay A. and P. at Waipukurau.
*25 January—North Kaipara A. and P. at Paparoa.
29 January—Marton District A. and P. at Marton.
*31 January and 1 February—Rodney A. and P. at Warkworth.

February

1 February—Otorohanga A. and P. at Otorohanga.
1 February—Rangitikei A. and P. at Taihape.
6 February—Matamata A. and P. at Matamata.
7 and 8 February—Taranaki A. and P. at New Plymouth.
*7 and 8 February—Taumarunui and District A. and P. at Taumarunui.
8 February—Hukerenui A. and P. at Hukerenui.
8 February—Woodville A. and P. at Woodville.
11 and 12 February—Dannevirke District A. and P. at Dannevirke.
12 February—Te Awamutu A. and P. at Te Awamutu.
14 and 15 February—Franklin A. and P. at Pukekohe.
*14 and 15 February—Ohura A., P., H., and I. at Niho Niho.
15 February—Waiapu P. and I. at Ruatoria.
15 February—Pahiatua A. and P. at Pahiatua.
15 February—Northern Wairoa A. and P. at Mititai.
15 February—Opotiki A. and P. at Opotiki.
21 and 22 February—Masterton A. and P. at Masterton.
*21 and 22 February—Te Kuiti and District A. and P. at Te Kuiti.
22 February—Putaruru A. and P. at Putaruru.
22 February—Whakatane A. and P. at Whakatane.
26 February—Morrinsville A. and P. at Morrinsville.
*28 February and 1 March—Wellington and Hutt Valley A. and P. at Trentham.

March

1 March—Waiotira Junction A. and P. at Waiotira.
1 March—Mangonui County A. and P. at Kaitaia.
1 March—Albany A. and P. at Albany.
1 March—Te Puke A. and P. at Te Puke.
8 March—Kumeu A. and P. at Kumeu.
8 March—Tauranga A. and P. at Tauranga.
*15 March—Wellsford A. and P. at Wellsford.
15 March—Hawke's Bay A. and P. at Hastings.
22 March—Poverty Bay Autumn Carnival at Gisborne.

SOUTH ISLAND

November

10 November—West Otago A. and P. at Kelso.
16 November—Taieri A. and P. at Outram.
20 November—North Otago A. and P. at Oamaru.
22 and 23 November—Nelson A. and P. at Richmond.
*23 November—Courtenay A. and P. at Kirwee.
23 November—Waimate A. and P. at Waimate.
23 November—South Otago A. and P. at Balclutha.
30 November—Motueka A. and P. at Motueka.

December

3 and 4 December—Gore A. and P. at Gore.
6 December—Wyndham A. and P. at Wyndham.
7 December—Otago Peninsula A. and P. at Portobello.
*10 and 11 December—Southland A. and P. at Invercargill.
14 December—Tokomairiro A. and P. at Milton.

January

11 January—Blueskin A. and P. at Waitati.
18 January—Waikouaiti A. and P. at Waikouaiti.
25 January—Waiau A. and P. at Tuatapere.
*25 January—Golden Bay A. and P. at Takaka.
26 January—Peninsula Horse Show and A. and P. at Duvauchelle, Banks Peninsula.
28 and 29 January—Otago A. and P. at Dunedin.

February

1 February—Banks Peninsula A. and P. at Little River.
8 February—Palmerston and Waihemo A. and P. at Palmerston.
15 February—Murchison A. and P. at Murchison.
15 February—Inangahua A. and P. and Sports at Reefton.
22 February—Maniototo A. and P. at Ranfurly.
22 February—Kaikoura A. and P. at Kaikoura.

March

*1 March—Temuka and Geraldine A. and P. at Winchester.
8 March—Cheviot A. and P. at Cheviot.
*8 March—Mount Benger A. and P. at Roxburgh.
15 March—Hawarden A. and P. at Hawarden.
*15 March—Upper Clutha A. and P. at Wanaka.
22 March—Mayfield A. and P. at Mayfield.
*29 March—Methven A. and P. at Methven.

* The Department of Agriculture exhibit will be staged at this show.

Ram Fairs

The following are dates and venues of ram fairs up to 14 February:—

9 December—Central Hawke's Bay at Waipukurau.
12 and 13 December—Hawke's Bay at Hastings.
8 January—Masterton stud at Masterton.
9 and 10 January—Masterton flock at Masterton.
21 and 22 January—Feilding flock at Feilding.
14 February—Dannevirke at Dannevirke.

Feed Flavours in Milk and Cream

By G. PURVIS,
Superintendent of Butter Instruction, Department of Agriculture, Hamilton

THOUGH in the main dairy production months the flavour of milk, cream, and butter is usually attractive, it is generally recognised that in spring it is not quite so good, being referred to by consumers as having strong feed flavours. These characteristic seasonal flavours are noted by the Dairy Division's instructional staff while checking the grading of milk and cream at dairy factories, by dairy factory staffs who do the grading and processing, and by Dairy Division butter grading staffs at the various ports.

THE feed flavours are the cause of a financial loss to the dairy industry totalling many thousand pounds. Details of these losses are as follows:—

Extra costs involved in locating taints, such as that from land cress.

Increased processing costs in an endeavour to remove them.

Lower grading points with resultant lower monetary returns.

To maintain and improve New Zealand's position on overseas markets in the face of increasingly keen competition it is of paramount importance that the flavour of dairy produce should be uniform and choice. In other words, when consumers taste the product the flavour should be so attractive that they will be encouraged to look for more and in doing so they should feel assured that they will get the same uniformly high quality which appealed to them before.

If cows are healthy and milk and cream are produced hygienically, cooled, and delivered to the dairy factory or milk treatment station daily, the flavour of both is largely dependent on the characteristic flavour imparted by what the cow eats.

HEADING PHOTOGRAPH: By controlled grazing feed flavours can be much reduced and production increased.

The flavours and odours of the fodders consumed are transferred through the intestinal tract and the lungs to the bloodstream, and thence pass off through the bodily secretions, including the milk. An illustration of this is the feeding of fresh swedes to dairy cows before milking.

Small quantities of weeds having a characteristic flavour, such as garlic and land cress, when eaten by dairy cows can dominate the flavour produced by remaining good fodder and so taint the milk. The defect can be traced readily by comparison of the flavour and odour of the weed with that of the milk.

From investigation by officers of the Department of Agriculture it has been established that farms having balanced swards of high producing grasses and clovers and where a good system of controlled grazing is practised have a high production per acre with low feed-flavour intensity, and conversely farms having a low production per acre due to clover dominance and weeds have a high feed-flavour intensity.

Fortunately, therefore, the adoption of practices which encourage growth of high producing pastures, and with controlled grazing, the incidence and intensity of the various feed flavours can be much reduced and production increased.

Preventive Measures

It is essential some hours before milking to take cows off pastures producing heavy taint.

If grazing of the herd on pastures in which land cress and other strongly flavoured plants are interspersed is unavoidable, or if root crops are fed out, this should be done immediately **after** and not for at least 3 hours **before** milking.

The aeration of milk before it is cooled is also a big help in reducing the intensity of food taints.

Valuable and interesting information on feed flavour defects and methods of improvement is contained in Bulletin No. 360, "Feed Taints in Cream". This bulletin is recommended to every dairy farmer, and is obtainable free from Farm Dairy Instructors on request or from local offices of the Department of Agriculture. The Instructor in Agriculture for the district can also supply information on methods of avoiding feed flavours.

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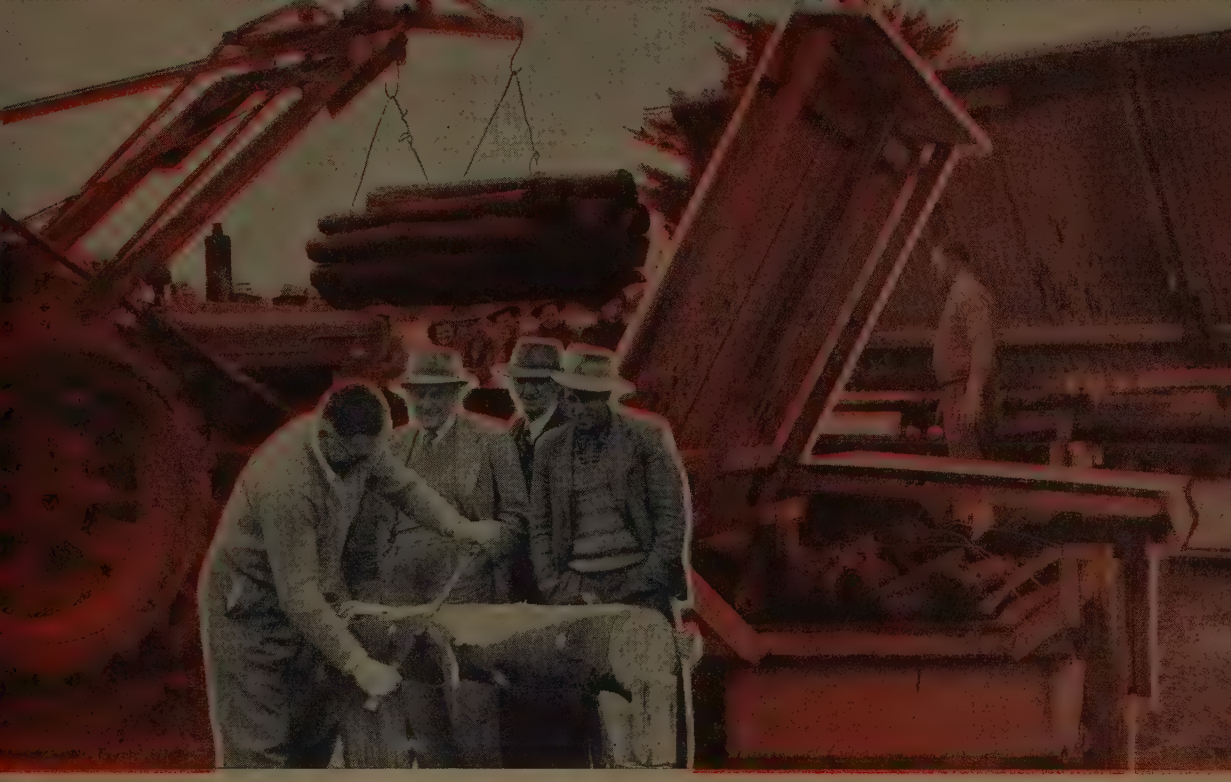

Farm-grown Radiata Provides

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AN enthusiast for *Pinus radiata* posts grown, cut, and preservative treated on the farm is Mr. J. S. Stronge, Oaonui, Taranaki. At current prices he can have them ready for inclusion in a fenceline for 4s. per post, and he knows of their having lasted at least 25 years in the ground. The illustrations show him demonstrating his methods during a field day of the Rahotu-Oaonui Farm Improvement Group and the Taranaki Farm Forestry Association in July last.

Fifteen-year-old radiata he thinks provides the ideal post, the one with the most sap in it, in his district, in which shelter is so essential but available species suitable for planting are so limited. The water-table is so high that many tall species are blown over because the ground is not deep enough to encourage development of a rooting system adequate to withstand prevalent high winds. Radiata older than 15 years begins to thin near ground level and to create draughts rather than provide shelter.

Posts are cut from a felled tree and left uncovered for 2 or 3 months and then stacked under some sort of shelter. To determine when posts are fit for the preservative treatment, random samples are marked in the stack and taken out periodically for weighing. When their weight is stable for about 6 weeks posts are considered ready for the dip treatment. Posts cut in August 1956 were ready by March 1957.

Mr. Stronge gets creosote on to his farm in Egmont County from the Wellington suppliers for 3s. per gallon and he estimates that with an allowance of a gallon of creosote and 1s. for labour for the preparation of each post, posts cost him 4s. each. Variation in the quality of creosote from different gas companies and even in different batches from the same company is common, and Mr. Stronge considers some standardisation desirable.

ILLUSTRATIONS ABOVE show, at back, handling of a wire-tied bundle of posts by the tractor hoist, with the counter-balanced galvanised corrugated iron roof of the vats raised; inset, posts in the vats with a draining bundle weighing down a completely immersed bundle beneath; and removal of all bark with a long, two-handled curved knife in preparation of a post for immersion in the creosote.

Posts are treated in old factory cheese vats (see illustrations) that accommodate 60 to 70 at a time. Posts for immersion are wire tied in bundles and many of the objections about the messiness of timber preservation are overcome by using the tractor hoist for the job. A bundle of posts that has had sufficient immersion in one compartment is lifted across to weigh down another bundle newly immersed in the next-door compartment and left there to dry out. Rate of absorption of the creosote appears to vary with temperature and to be slower in cold weather. The best time for dipping appears to be in March or April and 48 hours' immersion then seems adequate. Ends of posts when cut are trimmed on the slant so that they will shed weather when in the fenceline.

Treated posts that were cut both lengthwise and in cross section during the demonstration showed thorough impregnation with the preservative and were considered by Forest Service officers who inspected them to be entirely satisfactory.

Ordinary staples hold quite well in Mr. Stronge's posts, but some people recommend use of longer staples in radiata pine.

—*G.J.N.*

FARM IMPROVEMENT IN EGMONT COUNTY

Field Day of Rahotu-Oaonui Group

By G. J. NEALE

A STOCKTAKING of 4 years' operations of the Rahotu-Oaonui Farm Improvement Group in Egmont County, Taranaki, was taken during a field day of farmers of the district and Department of Agriculture and Forest Service officers on two of the six farms in the group in July last. After development and improved management practices on the properties had been seen and discussed, statistics summarising data supplied to Department of Agriculture economists during the period and showing progress made by farmers in the scheme were presented and discussed at an evening meeting in a local hall. There was general agreement on the benefits derived from the scheme by the six farmers in the group and by other farmers in the district who had had continually before them during the group's operations the example of the improvements being effected. Because it was felt that the farms in the group were only on the threshhold of producing material results from the 4 years' effort, it was unanimously decided to ask the Department of Agriculture to continue the group longer than the 5 years originally intended.

THE group is one of three in the Taranaki Province, the others being centred at Stratford and Riverlea. There is a total of 14 farms in the three groups. Similar groups are in current operation in Manawatu (5 farms), Golden Bay (7 farms), Murchison (4 farms), Rotomanu (4 farms), Harihari (3 farms), Belfast (5 farms), Sefton (3 farms), and Orton (4 farms). Other groups have completed the prescribed term under the Department's guidance and been wound up.

How Groups Work

The broad principles of operation are the same in all groups. Groups are under the immediate advisory supervision of the Department of Agriculture's local Instructor in Agriculture. Participating farmers agree to supply all the necessary management and production records to the Department's economist in the district. Farmers in groups meet regularly with the Department's Instructor to discuss the development programme, and beside giving each participating farmer the continuous personal attention necessary, the Instructor is the liaison for any other specialist assistance required by the group. For instance, for this group in Egmont County, A. C. Burgess, Instructor in Agriculture, New Plymouth, arranged Dairy Division testing of milking machines on all 6 properties; a comprehensive soil test of each property by the Department of Agriculture; and assistance with soil type delineation by the Soil Bureau of the Department of Scientific and Industrial Research. His plot trials on the farms were the basis of fertiliser recommendations.

Collection and analysis of management and financial data for the group are done by A. Kearton, Farm Management Officer, Department of Agriculture, Palmerston North. General supervision of the economics and bookkeeping aspects of all groups in the scheme is exercised by the Land Utilisation Officer of the Department of Agriculture, R. H. Scott, and the scheme, as part of the advisory service of the Department, is under the overall control of the Director of the Extension Division, J. W. Woodcock.

Oaonui-Rahotu Group

When farmers in the Oaonui-Rahotu district approached the Department of Agriculture in September 1952 to form a dairy farm improvement group they were asked to submit a list of farms for inclusion in the group. Of the 18 farms submitted, 6 were selected as being the greatest number it was practicable to operate in a group and at the same time the number was sufficient to cover fairly well the variety of properties in the district. The farms

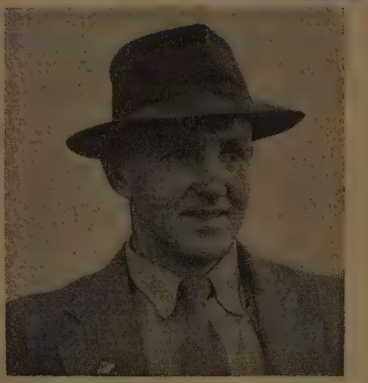
▲ View across the ring plain that lies between the slopes of Mt. Egmont and the coast. The hummocks are characteristic of this volcanically formed countryside.

were also distributed widely enough to enable farmers in the district to have at least one of them fairly close at hand as an example and an incentive. This, of course, is the primary aim of the scheme, that properties within improvement groups should be demonstration farms pointing the way to lifting the average level of management and therefore of production. Farmers participating in groups offer themselves as "guinea pigs" for solution of problems peculiar to their district and the success of the schemes has been in large measure due to the ready co-operation of the farmers with the Department's Instructor and their willingness to place management and business details of their properties in the hands of Departmental officers.

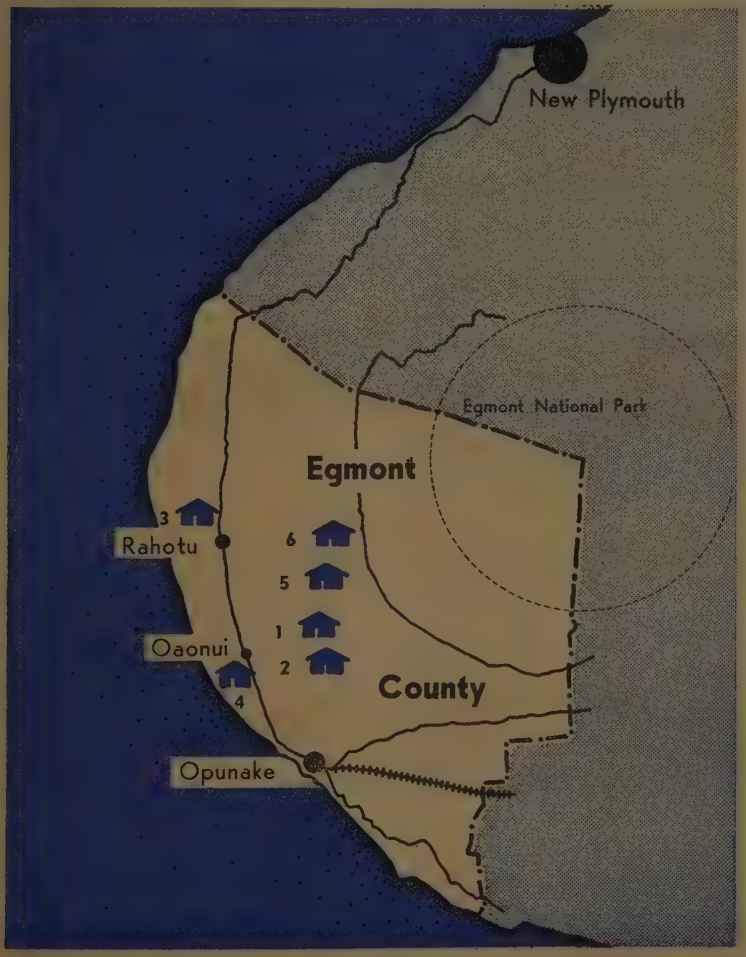
No arbitrary improvement programme is laid down for the group as a whole. Each property is considered on its merits and the objectives are to increase production economically through land and pasture improvement and management, any improvements to be within the financial resources of the particular farm.

The District

Egmont County is comprised largely of a segment of the ring plain that circles Mt. Egmont (8260ft.) and the Puakai Range and is the main dairying land of Taranaki. The 6 farms in the Oaonui-Rahotu group are disposed on the south-west of the turned-down brim of the great conical hat that is Mt. Egmont. The ring plain cannot, however, be likened to flat areas like the Canterbury or Heretaunga Plains. In the comparatively short distance between the foot of the steep slopes of Egmont and the coast it tumbles to the sea in gentle and easy rolling country that varies considerably in altitude and is very broken by streams which, flowing down from Egmont and the Puakai Range, form a radial pattern that is a distinctive feature of the country. From south of Okato to Opunake a dominating physical feature is the large number of conical hills ranging in height from a few feet to about 40ft. and with a number of swampy hollows in between.



A. C. Burgess, adviser to the improvement group and liaison for specialist services to it.



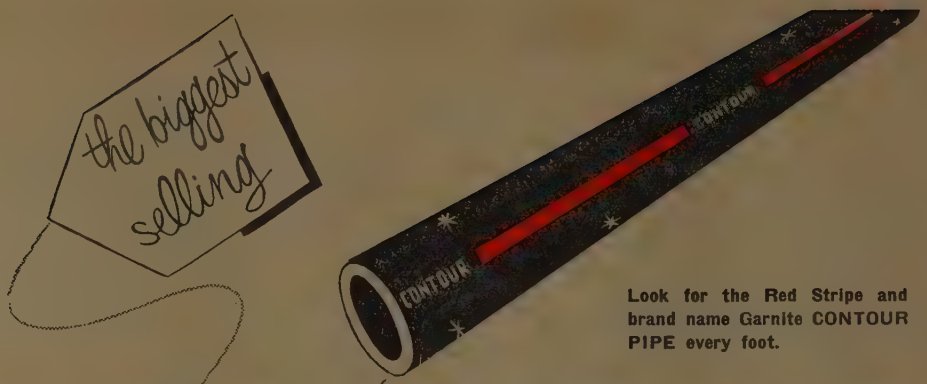
Part of Taranaki Province showing Egmont County and location of the 6 farms in the improvement group.

Soils

The volcanic soils of the district derive from ash erupted from Mt. Egmont. In the area from Okato to Opunake the ash fell on the hilly and hummocky land formed by gigantic mud flows from the mountain, and during soil formation some of the underlying material has become mixed with the ash to produce bouldery soils. In some of the heavy swamp soils of the district extensive iron pans occur 2 to 3ft. below the surface and complicate drainage patterns.

Climate

Mt. Egmont dominates the scene, as it does, too, the land use in all the area coming within its shadow. Having vomited up the basic ingredients of the soils of this part of Taranaki during its active phase, it continues in its volcanic quiescence to govern to a large extent, by its influence on local climate, the pattern of farming. There is a local saying that "When you can't see the mountain it's raining, and when you can see it it's going to rain". Like most apparently slighting references to local topographical features, Taranakians' references to their "hill" conceal a deep-rooted affection for the mountain that as they bend to their labours continually presents evidence of its contribution to the formation of the land they work; and as they lift their eyes to its snow-clad slopes or to its envelopment of cloud, they are reminded of the elements of rain, wind, and frost on which the great peak is for ever working as a catalyst.



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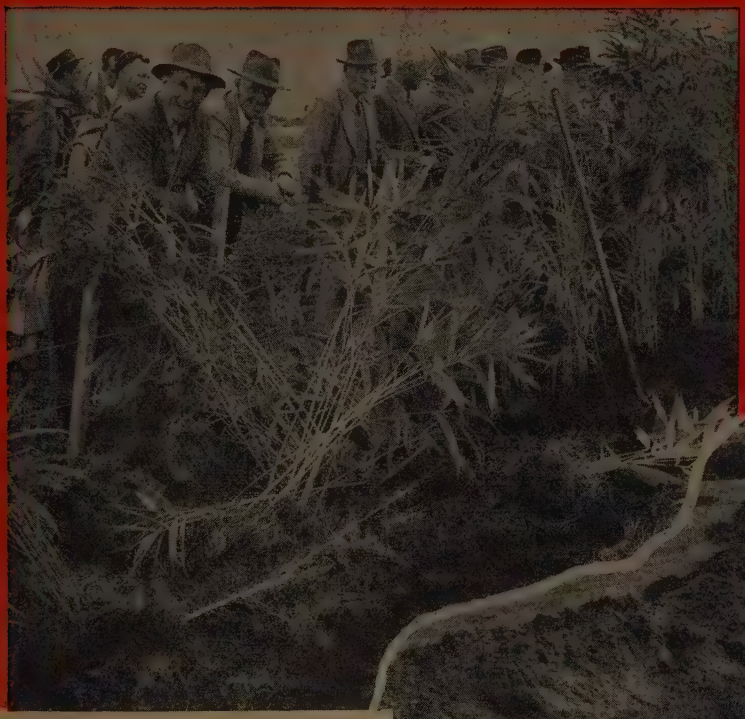

← Experimental planting of bamboo shelter on farm No. 4. Advantages claimed for bamboo are that its width can be confined to 2ft. 6in. to 3ft. with a light fence on either side; it provides high, dense shelter very quickly; and stock will control any side growth and prevent encroachment on pastures.

▼ Typical major operations in farm improvement, showing large trench excavated in the badly drained shingle pan by drain digger and filling in by tractor-mounted blade after tile drains have been laid.

On the upper slopes of the mountain annual rainfall exceeds 200in. In coastal areas it is between 45 and 60in. In the area covered by farms in the improvement group it ranges between 50 and 70in. The heavy rainfall on the mountain's slopes runs off on to the surrounding ring plain as from a giant lemon squeezer.

Rainfall is well distributed. February generally is the driest month. May, June, and July are very wet, with a falling off in August. Westerly winds that are prevalent in spring bring heavy and frequent rains that are important in getting pasture growth away to a good start for the dairy season. Summer rainfall is not so reliable, but there are seldom severe droughts.

Prevailing winds are from the north and north-west, but southerlies and south-easterlies with rain are also fairly frequent in the district. These winds are very cold and frequently give a decided check to pastures.

Removal of the original heavy canopy of rain forest in the development of the country for pastoral farming has left as a legacy the problem of provision of farm shelter in this district where persistent and often cold winds are a factor tending to retard grass growth otherwise encouraged by liberal rainfall.

Farm Shelter and Timber

The Taranaki Farm Forestry Association operating in the district is studying the provision of suitable timber and shelter species. It and similar associations in other parts of the country are encouraged by the New Zealand Forest Service through its Farm Forestry Section. One of the farms in the improvement group is being used by the Farm Forestry Association as an experimental farm for the planting of trees and shrubs for timber and shelter, and during the field day experimental plantings were examined and discussed and officers of the Association and the Forest Service spoke on the selection, provision, and management of suitable species.

Most of the information being accumulated by such organisations as the New Zealand Forest Service and the afforestation companies is restricted to a few species planted on large

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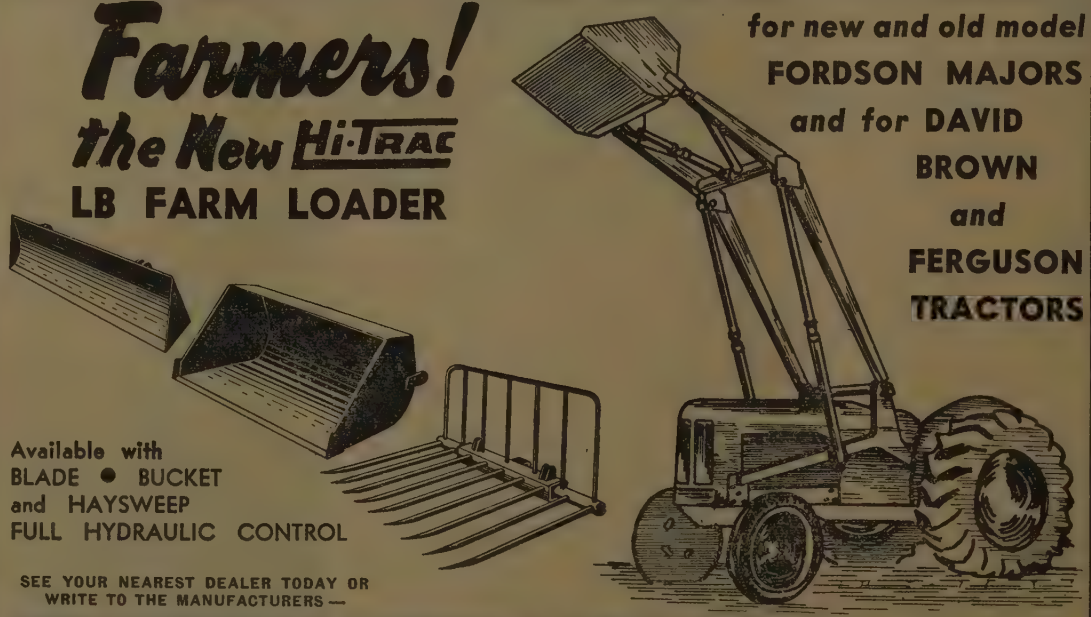

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areas. Many of the problems of the smaller forest owner or farmer requiring efficient shelter, involving as they do a greater diversity of species, will have to be solved by the farmer-forester himself with such aid as the larger organisations may be able to give. The field day showed the potential value of an association in gathering information on the performance of species hitherto used for shelter and timber in the district, dissemination of information on new species of likely merit, and the arranging of demonstration plantings and supplies of seedlings for members. The problem is essentially one of fitting a wide diversity of species to an equally diverse environment of habitat and climate, and local associations receiving the assistance of official organisations seem to offer the best prospect of avoidance of the disappointments and mistakes of the past that have resulted in many farm plantations decreasing rather than increasing production from the farm itself, creating draughts rather than providing shelter, and yielding insufficient farm timber to offset the loss in farm acreage or in production from pastures and crops.

This area of the Taranaki coastal country is generally very poorly sheltered and the work being done by the Association in demonstrating the best species to plant for farm shelter and for timber will have far-reaching value.

Farm Development

Problems of subdivision, drainage, renewal of farm buildings, and pasture and herd improvement have had to be faced by all farmers in the group. Those farms on which most basic development work had to be done are at the end of 4 years really only on the threshold of fully efficient operation.

Farm No. 4

Farm No. 4 in the group, of 114 acres, presented problems of awkwardness of shape for efficient subdivision as a dairy unit, of dissection by streams, and of drainage that are not uncommon on properties in the district. A deep stream approximately bisects the farm and there is another smaller stream on the property. Part of the farm is a naturally well-drained, coastal loam, but the remainder before improvement was poorly drained with a shingle pan, characteristic of this part of the volcanic ring plain, that holds the water as in a subterranean saucer and complicates drainage. The first major step towards improvement was the provision of a race giving access to all paddocks without the need to take stock through others. This could not be done by a single central race, but from the cowshed one race runs straight to the back of the farm, serving all paddocks over the main creek, and another runs alongside this creek, serving the front paddocks. Most of the drainage is now done and many parts of the farm are tiled.

The property was taken over 7 years ago by the present owner and in its unimproved state in the first season carried 50 milking heifers with a season's production of less than 13,000lb. of butterfat. This farm showed the most spectacular production increase during the currency of the improvement scheme and last season carried a milking herd of 86 for a butterfat yield of 27,000lb., more than double that of the first year of the present owner's occupancy.

When the farm was taken over most of it was in very poor pasture typical of much of the coastal country, comprising predominantly browntop and chewings fescue, with a lot of Yorkshire fog. Some paddocks were infested with stunted blackberry. To get at least some better pasture quickly the first resowing was on a grass-to-grass basis, but once the owner had a small area of respectable pasture to work with, the pasture renewal practice of taking a crop of soft turnips before resowing to grass was adopted. Turnips help considerably as a supplementary feed in dry seasons and keep up production of the milking herd well when grass growth falls short of requirements.

Herd Replacements

In the first few seasons of comparatively rapid development and improvement, when in pursuance of the owner's aim of stocking to full capacity it was impossible to breed on the farm all the new stock required, herd replacements and increases were bought in, but in the last three seasons replacements have been reared on the farm, calves being fed whole milk for 8 weeks and then weaned, a system it is intended to continue.

Realisation of the aim to carry the maximum number of stock resulted in pastures often being short, but carrying capacity has been kept to the limit by making plenty of provision for the period of restricted grass growth in the summer. By the provision of turnips it is possible to keep production up then and save grass. All grass as a consequence is used to produce butterfat.

Stock bought in to maintain full grass utilisation comprised both heifers and mature cows. Nearly half the cows culled in the past two or three seasons, when it had become possible to breed the farm's own replacement requirements, were first and second calvers, which shows that it is much better to breed replacements on the farm than to buy in stock with unknown production records. As an interim measure to keep herd numbers up to the capacity of the farm the system of buying in has paid pending the owner's attaining the ability to breed his own replacements.

Management

Grazing management has been very good. After autumn-saved pasture is finished, cows are grazed for 24 hours in each paddock. Surplus spring growth is cut for silage in November and December. No hay was made last year. As large areas were cropped with soft turnips in the past three years (16 acres in 1954-55, 9 acres in 1955-56, and 18 acres in 1956-57), there has been no surplus autumn feed at all, but, as mentioned earlier, all grass was used to produce butterfat.

Topdressing on this farm was with superphosphate at about 4cwt. per acre and muriate of potash at 1cwt. per acre, applied mainly in the autumn. From this year spring and autumn topdressing of 2cwt. per acre of superphosphate and 1cwt. per acre of potash at each application will be carried out. Experience has shown that ample dressings of phosphate and potash are all that are required in this area to get vigorous pasture growth.

Wintering the Herd

The milking herd is wintered on the system evolved by Dr. L. R. Wallace at the Department of Agriculture's Ruakura Animal Research Station and that has become known in the New Zealand dairy industry as the Wallace system.

Fifty to 60 acres of pasture are shut up at any time from early in April to the end of the month. As cows go out of production they are fed hay and silage in the late autumn and early winter. Those still in milk are fed some silage and confined to two or three paddocks while still in milk. From the end of June on all cows are fed in breaks on the saved grass by use of the electric fence. To aid recovery of winter grazed pasture all breaks are back-fenced so that stock are on any area for only 24 hours.

Last winter was very wet, with 2 or 3in. of rain falling on some days, and silage was fed in breaks. With all the cows on a small break of about an acre it looked as if they might disappear in the sodden pasture, but all breaks were back fenced, a system that confines any damage likely to occur from pugging to a small area that can easily be oversown if necessary. However, the grass recovered quickly and in a few weeks, though it was possible by looking closely to see the badly pugged area, no serious damage to the pasture was apparent.

On No. 1 farm of the group, which is a very wet one, break feeding of 140 cows on 1½-acre breaks in a very wet spell last season was considered to have done less damage than would have been expected in a big paddock set stocked. Pasture damage under

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this apparently rigorous system seems to be far less than some farmers fear. Three electric fences are required for complete insurance against pasture damage with this method in the typically wet winters of the district. In addition to that marking the strip being grazed, one is required for back fencing to prevent the herd returning to already grazed strips and another is required to prepare the strip ahead, so there is no delay in shifting them to new feed.

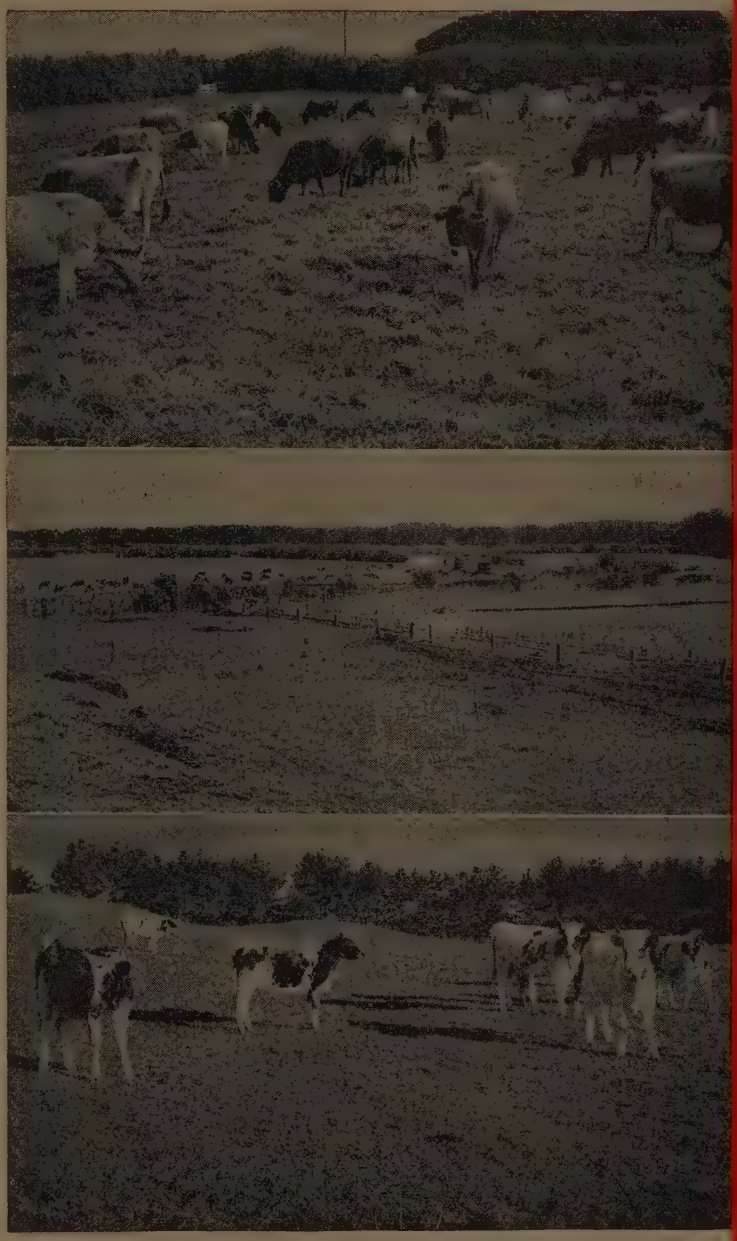
A question whether this "steaming up" treatment of having cows on good grass before calving would result in their calving as well and starting production in better form than cows wintered on hay and silage was answered at the field day with a very definite affirmative from the owner of the farm, who said he considered his method by far the better. There were perhaps more cases of milk fever, but these seemed to be simple milk fever and responded quickly to treatment. Last season, which was a dry one, factory figures were generally down, but production on this farm was 500lb. of butterfat up. In the Stratford district there had been an instance of an increase from 380lb. of butterfat per cow to 430lb. per cow in the season after the system of break feeding the herd on grass from the middle of winter was adopted.

Provision of water for break-fed cows is important and a movable trough was used on this property pending acquisition of a reel-fed trough developed by another farmer in the group.

All breaks are harrowed within a day or two of feeding off to spread droppings and promote early recovery of the pasture. Back fencing is considered important in preventing the nipping off of the new young growth so important to ensure the early recovery of pastures.

The tendency of the vigour of white clover to be affected by the Wallace system was raised, but according to Mr. Burgess there is no indication that the system reduces white clover. Management should provide for avoidance of shutting of the same paddocks year after year so that the clover has a good chance to recover. On this farm it is not until September that one can be sure the grass is coming away properly, which means that there are 3 months in which autumn-saved grass has to be fed. In that time the herd is break grazed twice round saved pasture, the second time twice as quickly as the first. Recovery of pastures from the middle of August on is enough to ensure that ample grass is available for the second round of grazing.

An alternative suggested by Mr. Burgess was to take the wintered herd only once round the saved pasture with correspondingly smaller breaks. On a wet farm it was better to go



Upper—Dry cows on farm No. 4, wintered on the Wallace system, are given the run, 3 or 4 weeks before calving, of saved grass held out of the rotational system. As they calve they are taken in with the milking herd on the break grazing system. At this time there are two separate herds, of milking and dry cows, on the property. Middle—Milkers grazing a break on farm No. 4, with, in the foreground, race access to paddocks bordered by recently planted bamboo shelter. Lower—Some of the first crop of artificially bred heifer calves on farm No. 1.

round a bit more quickly and not graze so hard. On farm No. 1 of the group the once-round system was favoured as being conducive to a dense recovery growth.

An advantage of the twice round system pointed out by Mr. Burgess is that paddocks are not shut up so long and in the first round they are not grazed so hard.

Presentation of Balance Sheets

"The great increase in production that could be obtained in this district, as in many other districts in New Zealand, by the application of certain methods, hard work, and more capital to properties already in occupation has been shown by the operations of this farm improvement group, one of a number operated by the Department," said Mr. Woodcock in opening the evening meeting at which data in the accompanying tables were presented by Messrs. Scott and Burgess, whose summarised comments follow.

TABLE 1—FARMS IN SCHEME

Farm	Area (acres)	Cows milked 1955-56
1	224	118
2	200	113
3	280	157
4	114	87
5	239	06
6	142	72

TABLE 2—ANIMAL UNITS PER 100 ACRES*

Farm	1953-54	1954-55	1955-56
1	62	63	64
2	72	60	73
3	78	84	84
4	80	82	90
5	41	49	54
6	57	66	68

* All stock converted to the unit dairy cow in milk.

Burgess: Development of farms 1 and 2 has been carried to a stage where carrying capacity could rise very considerably, and this should be evident from now on.

Farm 3 is a coastal one that had a large amount of paspalum pasture that was not giving much production. Until the pastures were improved, which they have now been, carrying capacity could not increase appreciably.

Farm 5 was a poor one initially, but the progress is good. Farm 6 is progressing steadily.

The most important factor in development of these properties is to increase stock numbers to keep pace with improvements effected, and this is not always easy.

Scott: The figures probably reflect an inevitable lag of production behind improvement and if the scheme is continued for a while there will be marked increases.

In improvement groups in the Waikato, most progress was made in the first year's activities, wholly as the result of the application of improved management methods. But most of those were well improved farms when the scheme started. Because the farms in this Egmont scheme are not wholly improved, the ultimate results can be expected to be better.

J. W. Woodcock: Farms in the group have "only started to improve".

TABLE 3—BUTTERFAT PRODUCTION PER ACRE (lb.)

Farm	1952-53	1953-54	1954-55	1955-56	1956-57
1 ..	142	151	139	125	143
2 ..	162	160	164	151	156
3 ..	—	177	190	184	190
4 ..	168	186	202	232	236
5 ..	84	95	105	105	109
6 ..	113	118	147	124	129

Burgess: Though one often hears of spectacular increases being obtained on individual farms, it is not always so easy. On one farm in the group a third of the herd slipped in one season, which gives a very false picture in the table. It often takes a year or so to catch up in production after such a setback.

On all farms in the area the weather affects so much the time at which grass comes away in the spring and therefore production from that lactation.

TABLE 4—AVERAGE BUTTERFAT PRODUCTION PER COW (lb.)

Farm	1953-54	1954-55	1955-56
1	282	297	272
2	266	286	276
3	300	313	339
4	254	281	310
5	290	278	271
6	244	285	255

Burgess: The per cow productions are generally not very high and all are below the Taranaki herd test average. There are too many short-season cows in these herds. Questions that would bear looking at are the efficiency of the milking technique on the farms and whether there is insufficient feed at particular and crucial times of the year. In those herds that were tested there were far too many low-producing cows. The average length of lactation is also not as high as it should be. The figures should be noted by the particular farmers and the remedy sought.

Scott: I wonder whether farmers make adequate use of herd testing records as a guide to herd policy. In some herds in improvement groups the Department has found that a considerable percentage of cows is below, and only a small percentage above, the New Zealand average production. There appear to be too many low-producing cows in the herds.

A group farmer: It is only lately with the introduction of artificial breeding that we have had an opportunity to remedy faults of low-producing cows in a herd and not just take another gamble on a different bull. It will still be a long time before we can really make adequate use of herd testing records.

Burgess: The use of artificial breeding is one of the valuable aids that has come along to help solve this problem. The average production of artificially bred daughters has proved to be nearly 20lb. higher than that of the mature cows in the herds in which they are milked.

A group farmer: A problem is the short milking season. A lot of us have our herds coming in two months later than they should, and when May comes and we should milk them on we don't, as we like to get all the herd out together.

Burgess: If there is a problem such as cows coming in late, advantage should be taken of the increased veterinary services available to see if there is a disease problem at the bottom of the trouble.

Big Improvement Imminent

That the farms in the group had at this stage only started to improve was the opinion of the three Department of Agriculture officers who presented the results of the 4 years' work. The full effects might not be apparent for 8 or 9 years. There might well be other farms outside the group showing more spectacular increases, but the principal aim in selecting the group had been to spread the selection over a range of types of property and to show the way to go about improvements rather than to seek increases for their own sake.

Thanks for the incentive given the group and other farmers in the district outside the group were expressed by Mr. R. Morris, chairman of the Oaonui branch of Federated Farmers. "Twenty years ago," he said, "we never saw autumn-saved pasture as we see it today. This and other similar ideas come from you people, and we are deeply grateful for Mr. Burgess's work and that of the Department."

Processing Honey to Obtain Soft, Finely Crystallised Product

By L. H. JOHNSON,
Apiary Instructor,
Department of Agriculture,
Palmerston North

A CRYSTALLISED honey very popular with consumers is a product which is very smooth and soft. It should remain in this condition during frosty weather. Honeys that become crystallised and solid will never compete with a spreadable product.

IN this article two systems are described for the processing of honey to obtain the desired smooth, spreadable product. The systems depend on adequate stirring and on controlled cool and warm temperatures. The variations in honeys due to floral sources and climate in different districts are such that individual beekeepers must be guided in some measure by local conditions.

The processing adds to the cost of production and takes a little extra time, but no producer-packer can afford to ignore it.

First System

The first system is adopted by Mr. E. J. Whalley of Parapara Road, Wanganui. It is not new, but is on well-proven lines and works well for a one-man apiary. Honey extracted from bee combs flows from the extractor to a warming unit, from which it is pumped to tanks in the adjoining room. Before entering the tanks it is strained. After standing in the tanks for a day until it cools to atmospheric temperatures the honey is skimmed. Then about 5 per cent. of very smooth grained, granulated honey is stirred in. It is usual to take a small sample from each tank of honey to ascertain the flavour and colour for blending later.

All the honey is then run into 60lb. tins which are marked and then stored in a cool room kept at 55 degrees F. After 10 days, when crystallisation is complete, the bulk containers are taken out of the cool room and stored in a room at atmospheric temperature. Usually this is during late summer and autumn, when temperatures are warm.

Blending Honey

After the extracting has been completed and the weather has become cooler packing of honey into small containers for the retail trade begins.

A study of the samples of honey will show which lines may be blended to obtain the desired colour. Any very dark honey may be very gradually worked in with the lightest colours or be sold as a separate line.

Repacking Crystallised Honey

In this system straining and seeding have already been done, so that all that is required is for the honey to be sufficiently heated to run out of the tins. This is done by standing the 60lb. tins in a tank of water and heating it to 130 degrees F. Heat is supplied by two electric elements under thermostatic control.

The honey needs to be heated to only 120 degrees F. for this purpose. Honey is then poured out of the tins into a tank on the floor and connected to a pump which delivers the contents into a tank in the adjoining room. Here the honey is allowed to cool for 24 hours or more according to the atmospheric temperatures.

Stirring and Pumping Improve Honey

It has been well established that stirring or agitating honey tends to hasten crystallisation, but stirring at intervals after the initial set has begun will retard complete solid granulation. Stirring is done mechanically by slowly revolving blades each with a radius of 1ft. 8in. The blades are attached to the vertical shaft 6in. from the bottom.

[*Nightingall*

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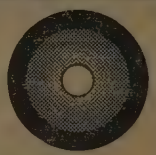

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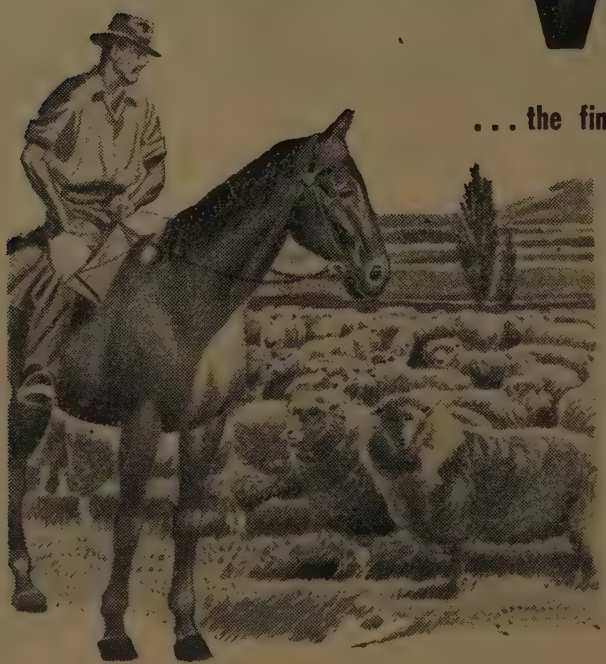

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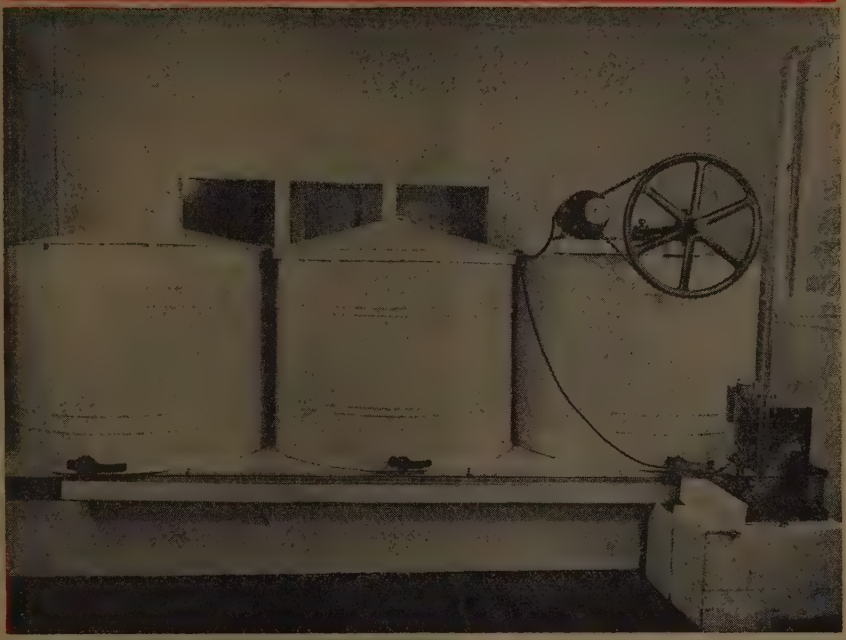
At this stage of the process, when the honey is semi-crystallised, air could very easily be worked into it. This must be avoided and is one reason why stirring manually with a paddle is not entirely satisfactory. A fast-revolving propeller is also liable to draw air down into the mass.

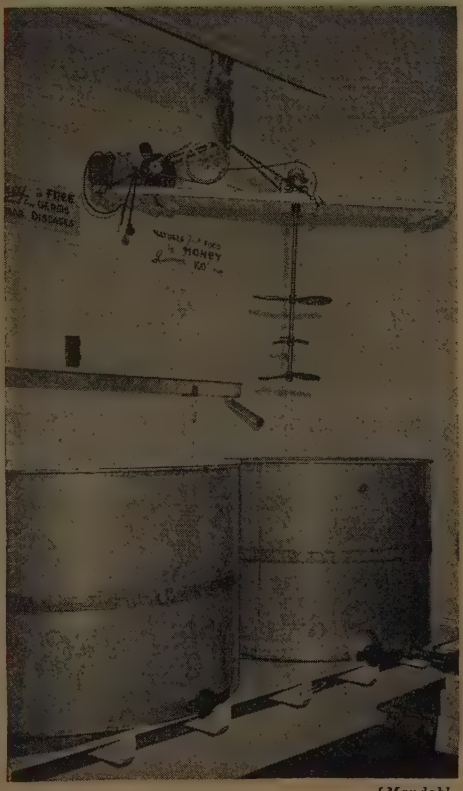
The same precautions must be taken with the installation of a pumping system. The pump used by Mr. Whalley is a gear type to run at two speeds. It has not only proved satisfactory as an impeller, but has a homogenising effect on the honey that has passed through it.

Honey is pumped from the stirrer tank to a small tank above the filling machine. To ensure that no air can be pulled in, the intake pipe to the pump is connected to the tank wall near the bottom. All joints in the pipeline and gaskets must be tight. The delivery end of the pipe is taken over the top of the small tank and down to near the bottom. Clear plastic piping appears to be suitable for this purpose, as it is easily cleaned, non-toxic, non-corrosive, and enables the operator to see the condition of the honey and whether air bubbles are present.



Storage tanks for honey with power-driven stirrer and gear-type pump.

[*Nightingall*



Honey tanks, showing stirrer hoisted up with block and tackle. It is on an overhead track so that it can be moved over other tanks.

[*Mandahl*

Honey-filling Machine

Filling honey cartons by a manually operated machine is practical for a one-man apiary. The beekeeper with an assistant during packing can fill 2750 1lb. and 2lb. cartons in 8 hours.

Temperature Control

Should atmospheric temperatures be cool, packed honey is stored in the packing room until crystallisation is complete. It is then moved into, and held for 10 days in, the insulated room which is used as a warm room. The refrigeration unit is switched off, leaving the fan only to run.

A tubular-type electric heater controlled by a thermostat is set to run at 75 degrees F. After 10 days the honey is softened, thus completing the processing of the honey for the market.

Second System

The second system is that adopted by Mrs. N. Anderson of Kawakawa Road, Feilding. Many tons of both bulk and packed lines of honey are handled by this plant each year.

The principles of securing a smooth, soft honey by stirring and temperature control are similar, but with this difference: There is a complete liquefying of honey and seedings at a later stage in the process.

Stocks of honey in bulk containers may be carried over from the previous season's extraction. This is necessary to ensure a continuity of supply.

Liquefying Honey

Bulk supplies of honey are liquefied in batches of 40 60lb. tins. Limited quantities of the previous season's honeys and some more recently extracted which are held in 60lb. tins are stood in a shallow concrete tank with water about 12in. deep. This is

heated by steam piped from a boiler. The honey is heated to 140 degrees F. to dissolve all crystals and destroy any yeast bodies which may be present. When the honey is liquid it is poured into a tank on the floor and after passing through strainers is pumped up to a chute which delivers it to a tank in the packing room. Here it is left to cool.

Preparing a Batch of Starter Honey

Before giving details concerning starter honey it may be as well to refute the erroneous statements often made that other substances are incorporated in honey to obtain smoothness of grain and lightness of colour. This is definitely not done by commercial beekeepers or honey packers in this country. Moreover, the position is governed by the following:—

1. The Pure Foods Act prohibits the addition of any substance to honey.
2. Most of the substances alleged to have been added will not mix with honey.
3. The flavour of almost any substance foreign to honey is easily detected.

The first requisite in building up a stock of starter honey is a small tank (¼- to ½-ton capacity). This tank is mounted on a small trolley for mobility.

First the contents of a 60lb. tin of very fine crystallised honey are poured into the tank and the same amount of liquid honey is added and thoroughly mixed by a mechanical stirrer. The tank (called the starter tank) with honey is then run into the cool room, where crystallisation is completed. More liquid honey may again be added and stirred until the desired amount is built up. It is kept in the cool room as stock for seeding honey when required. Leaving a quantity of crystallised honey as a starter for the next batch in the main tank and adding warm liquid honey is not recommended.

Introducing Starter Honey

There does not appear to be a formula for the exact proportion of starter honey to liquid honey, but in Mrs. Anderson's apiary about ¼ ton of starter honey is added to 1 ton of liquid honey. Starter honey is introduced by pumping it from the starter tank into the main holding tank, in which the mechanical stirrer operates.

Versatile Arrangement of Pipeline

A workable arrangement (shown in the diagram opposite) has been devised so that by the turning off of the stop-cock (B) on the pipeline (A) from tank to pump and the removal of a plug from the tee (C) a pipe may be screwed into it and the other end connected to the starter tank, which also has a stop-cock. At a level with the top of the main tank another short length of pipe (G) may be screwed into the tee (F) on the vertical pipe (E). The stop-cock (H) on the vertical pipe should be closed. The required amount of starter honey is pumped into the main tank while the stirrer is revolving.

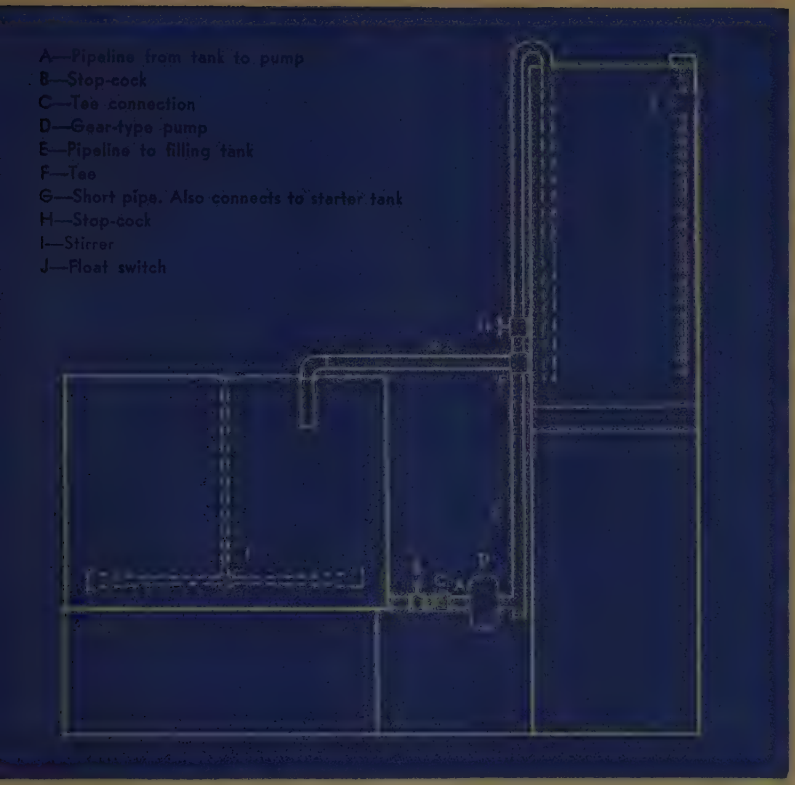
Using Honey Pump for Mixing Honeys

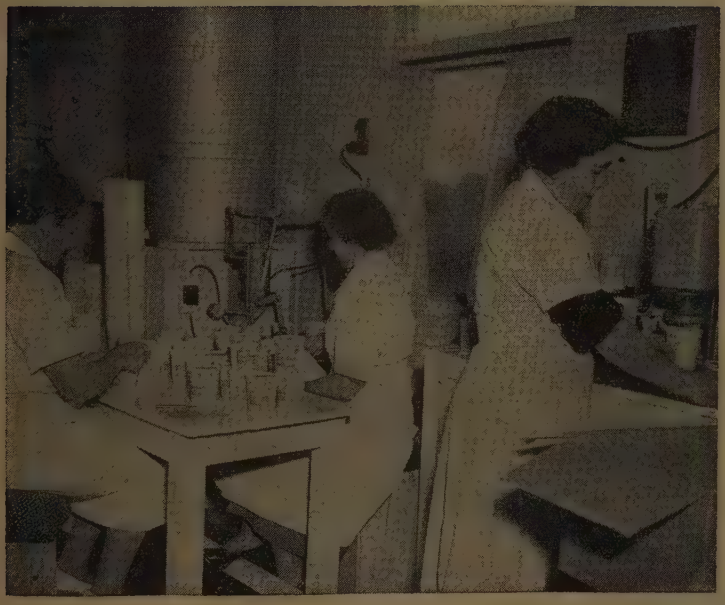
If the stop-cock on the starter tank is turned off, the pipe to the tee (C) may be disconnected and a plug screwed into the same thread. The stop-cock (B) may now be turned on. Honey can be pumped from the bottom of the tank and returned to the top, thus ensuring a thorough mixing of heavy and light honeys, which is an important part of the process. Streakiness often seen is an indication of inadequate stirring.

Filling Cartons

Semi-crystallised honey in the main tank is pumped into a ¼-ton tank to which the honey-filling machine is attached. The pump in use is for a 1¼in. pipeline. If crystallisation is well advanced, honey passing through the pump will receive sufficient mashing between the cogs to make it soft and creamy.

To avoid air bubbles the delivery end of the pipe is carried down to within 3in. of the bottom. The level of honey is automatically controlled by a float switch. It should be quite





[*Mandahl*

Packing cartons by a power-driven machine. Through practice and concentration female staff have become very adept at this work.

satisfactory if the delivery pipe from the pump is connected to this tank near the bottom instead of going over the top as at present.

Cartons are filled by a power-driven filling machine that two persons can operate.

The Final Process

Should atmospheric temperatures be below 55 degrees F., the packed honey is kept in room temperatures until crystallisation has taken place, usually for about 10 days. The cool room is now turned into a warm room and used as previously described. If cartons of honey are filled before warm weather or during summer, the cool room is used to initiate and complete rapid crystallisation, after which the packed lines of honey are taken out and stored at atmospheric temperatures to soften.

Summer Temperatures a Problem

Packing freshly extracted honey into cartons during January, February, and March is not always satisfactory, because of warm temperatures. Honey, though seeded, cannot be left in the stirring tank long enough for adequate stirring while crystallisation progresses. Semi-crystallised honey must be mature and not raw when run into cartons. This can be seen by the colour.

There is always the possibility of an unsatisfactory smoothness in grain. If the packing room is insulated and cooled, this problem will not arise.

Types of Honey and Atmospheric Conditions

Honeys treated by the methods described have been mainly from clover and catsear with perhaps 20 per cent. from mixed sources. Their crystalline solidity appears to have been overcome. Producers in the South Island may find it an advantage to blend in some North Island honeys with their product to help soften it and add to the flavour.

Quick Consumption of Soft Honey

The soft honey produced as described in this article appears to have satisfactory keeping qualities. However, each season's honey should be consumed within the year it is marketed. Such a delectable, creamy honey will be quickly used once it reaches the consumer. It is the lines of very hard or coarse-grained honey which are so slow to move that hinder the sales of the better product.

The spoilage of cartons of honey by long storage in unsuitable conditions when held by wholesalers or retailers may be avoided if producer-packers make regular monthly deliveries of limited quantities of freshly packed honey.

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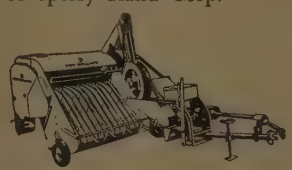

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The Home Orchard in Summer

WITH so many other activities at this time of the year there is often a tendency for home orchard work to be neglected. Time should be found for routine spraying and cultivation, or pest and disease damage will occur. Such damage cannot be repaired by more work later in the season. Routine work and seasonal disease control are discussed in this article by S. P. Money, Instructor in Horticulture, Department of Agriculture, Wellington, with some hints on the selection of fruit exhibits for shows.

The growth of pip fruit trees should be watched during summer. Sufficient new fruiting wood can be formed only if plenty of new laterals grow each year, and if growth is not vigorous enough, it should be stimulated by increased applications of fertilisers.

REGULAR spraying of pip and stone fruit trees is essential in summer to protect growing fruits from insects and diseases. Damage to fruit from codling moth and black spot fungus should be watched for, as it becomes noticeable at this time when fruits are swelling. If the full spraying programme for the home orchard is carried out, there should be no problem with pests and diseases. This programme was published in the August issue of the "Journal".

Cultivation round trees should consist of light hoeing sufficient to keep weeds down. This makes the picking up of windfalls and diseased fruit much easier. In orchards where rank grass and other weeds are allowed to grow beneath the trees diseased fruit and fruit affected with codling moth can lie unseen and become a source of further infection.

PIP FRUITS

In late summer the earliest varieties of apples should be maturing. To determine the stage of maturity a fruit should be cut and the seeds examined. When they are an even brown colour the fruit can be used for cooking, but if the fruit is required for dessert, the seeds should be dark brown or black. Early fruit such as Irish Peach or William's Bon Chretien pears, which do not store well, should be picked only as they are needed. Late-maturing varieties are usually better for storing.

Inspection of the trees at this stage will show if any woolly aphids are present. Spraying with lindane emulsion with a wetting agent is the best summer treatment, but care should be taken to direct the spray on to the groups of woolly aphids so that the material penetrates the mass and comes into contact with the bodies of the insects. If this is not done, the waxy, cottonwool-like covering which protects the aphids stops the insecticide from being effective. The wetting agent assists penetration. Severe infestation by woolly aphids can seriously affect the cropping of trees by destroying the young, developing buds on new season's wood. This is not immediately apparent, but becomes gradually noticeable as fruit buds are not replaced in succeeding years. When this trouble has caused a noticeable loss of crop it may take 2 or 3 years after the blind wood has been cut out for new fruit buds to begin functioning.

The amount of growth of pip fruit trees should be watched during summer. Sufficient new fruiting wood can be formed only if plenty of new laterals grow each year, and if growth is not vigorous enough, it should be stimulated by increased applications of fertilisers.

Poorly growing, stunted trees are common in many home gardens. These continue to bear fruit on old spur wood, but are not vigorous enough to produce new growth. This can lead only to gradual loss of crop and reduced quality as the fruit buds become exhausted and trees eventually die. Large initial quantities of nitrogenous fertiliser should be applied to these trees to initiate new growth.

The amount of fertiliser applied depends on the size of the tree. For a tree about 5ft. high 3lb. to 4lb. of dried blood should be scattered beneath the spread of branches and lightly hoed in. Approximately 1lb. per foot of height of the tree is a good guide to the fertiliser requirements of trees that appear to need stimulating.

If the unthrifty growth has been caused by lack of nutrients, this treatment will cause resumption of new growth for refurnishing. Other causes such as bad drainage and disease may be responsible, however, and supplying fertilisers will not have the desired

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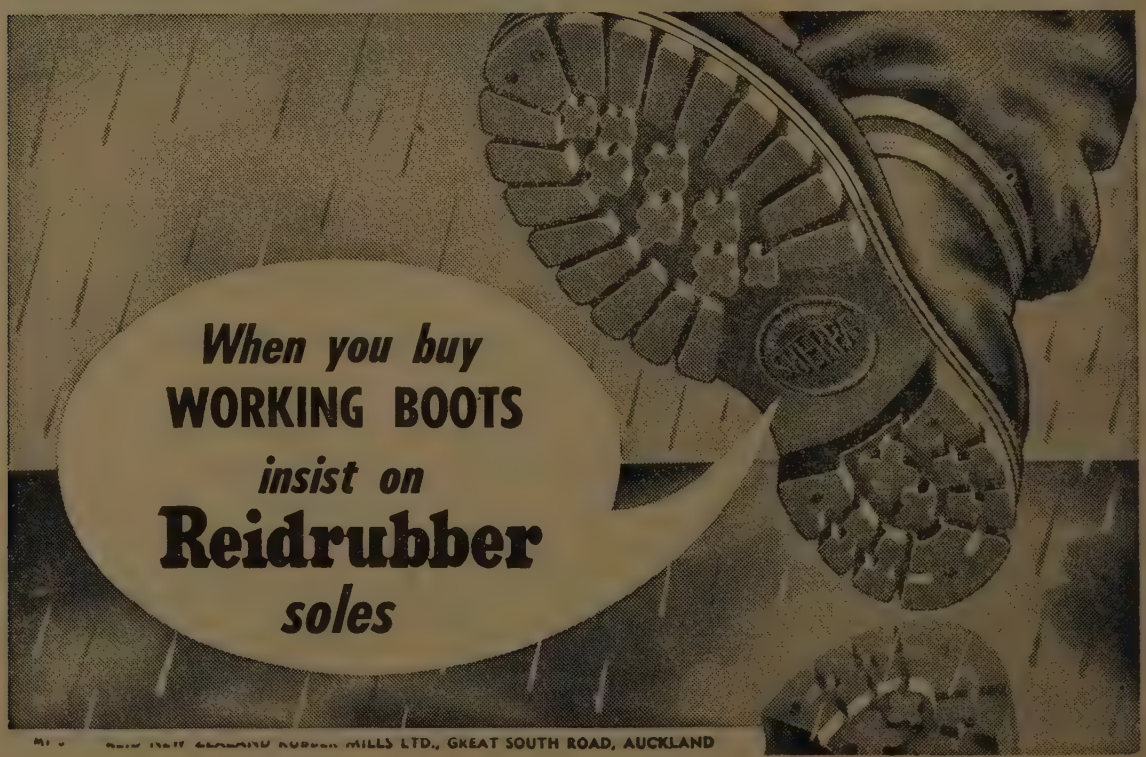

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result if other conditions are unsatisfactory.

A tree which has had its roots damaged by prolonged wet conditions during winter may develop unthrifty growth symptoms and attention should then be directed to drainage of the orchard.

Collar Rot of Apples

Collar rot of apples (*Phytophthora cactorum*) is responsible for the death of many trees; it is most severe in the variety Cox's Orange Pippin, and Ribston Pippin is also very susceptible. Cox's Orange Pippin, which was raised from a seed of Ribston Pippin, shows the same weakness to this disease as its parent. Gravenstein is also affected by this disease, but is much more resistent than Cox's Orange. Other apple varieties have shown only rare infections.

Another feature of this disease shown by a recent survey carried out by the Horticulture Division of the Department of Agriculture is that the disease is more common in older trees. Trees over 40 years of age showed the greatest amount of infection. Cox's Orange, Ribston, and other susceptible trees showed a high incidence of infection in wet areas at the foot of slopes or in hollows.

At present there is no effective means of curing this disease, but good drainage will assist greatly in prevention.

A useful method to protect trees from rabbits is to drive in three stakes round a tree and then wind tarred twine round the stakes (left). The stakes must be driven in upright and firm so that they will not be pulled in toward the tree (right) and damage it.

Fireblight

Fireblight (*Erwinia amylovara*), a bacterial disease of apples, pears, and quinces, can cause considerable damage in orchards if left unchecked. It is spread by insects which feed on the sugary exudation present on the fireblight cankers during the growing season. Bees are naturally attracted to this sweet substance and thus the bacteria are transferred to flowers.

Fireblight canker on a pear branch. Fireblight is a bacterial disease of apples, pears, and quinces which can cause considerable damage in orchards if left unchecked.

The disease is apparent by sudden death or progressive death of growing shoots, which become dark brown or black, resembling a burn by fire, thus the common name. Dead leaves remain attached to these shoots and make them easily distinguishable in late autumn. The disease overwinters in large cankers on pear, quince, apple, hawthorn, and cotoneaster trees.

Pear trees: Infection is liable to spread rapidly in pear trees, the organism quickly travelling from infected blossoms or young shoots to heavier branches, where cankers may be formed. If these girdle the branches, they soon die. Infection of pear trees, especially the first infection, is usually serious. The disease in subsequent years seldom reaches the virulence of the first outbreak, which has led to the belief that trees become partly resistant.

Apple trees: On apple trees blossom and twig infection only is likely to be prevalent; branch cankers are unusual. Fireblight generally ceases to spread when it reaches larger branches.

Treatment

In the treatment of fireblight special attention should be paid to pear and quince trees showing infection and every effort should be made to cut out and destroy infected parts as promptly as possible. On laterals and lighter branches the cut should be made well below the point of visible infection and the wound swabbed with a disinfectant. It should then be painted with a bitumastic paint. To prevent the spreading of infection all tools used should be dipped in a solution of formalin (1 part to 100 parts of methylated spirit).

In the past blossom and twig infections of apples were cut out, but in New Zealand there has been no known instance of the disease overwintering in apples, and apart from infected fruits, which should be picked and destroyed, little attention need be paid to apple trees until the winter pruning. The destruction of all fireblight cankers on pears and quince trees will to a large extent stop the spread of fireblight.

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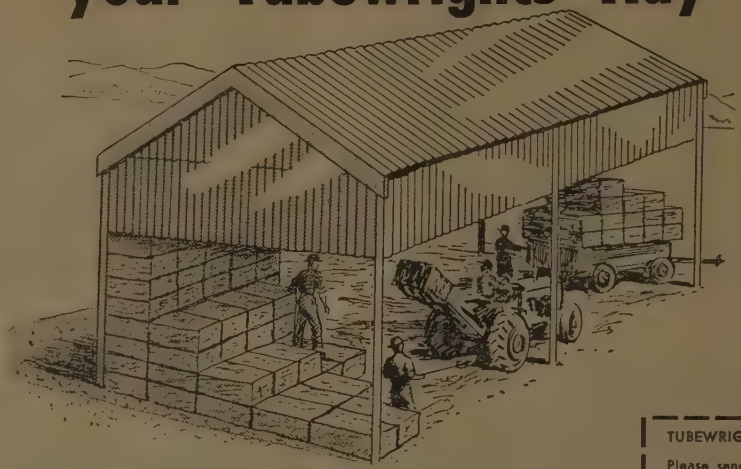

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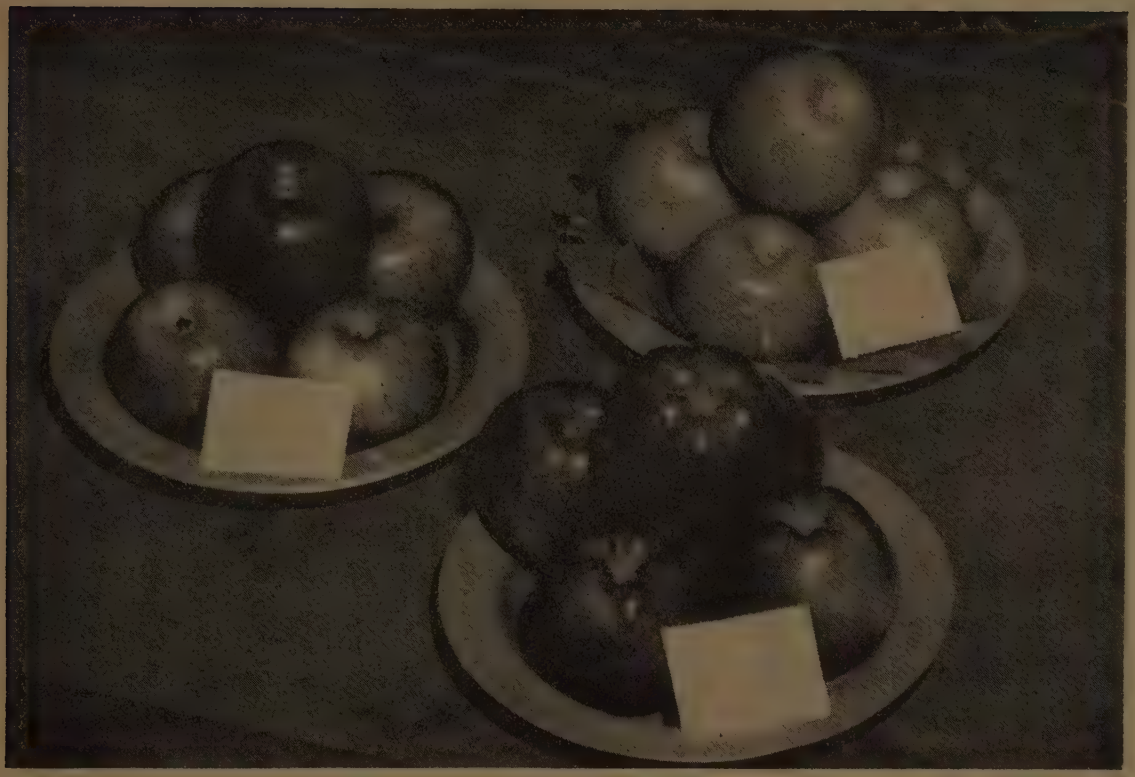

The two exhibits on the right are of a high standard for show fruit. The exhibit on the left is marred only by lack of uniformity of colour.

hares, and even if the trees are not completely ringbarked, such injuries may affect growth for a long time and may even result in permanently misshapen trees. The most successful method of protection is to surround the orchard or each tree with wire netting, but this is expensive. One other method is to wrap the trunk with newspapers. These, however, will not stand up to prolonged wet weather or spraying.

A useful method of tree protection in Central Otago is to drive in three stakes round a tree and then wind tarred twine round the stakes. The stakes are 20in. to 24in. long and ¾in. to 1in. in diameter, and they are driven 6in. to 8in. into the ground, 6in. from the tree trunk, so that they form a triangle. They must be driven in upright and firm so that they will not be pulled in toward the tree. At least three turns of twine are required round the stakes. Winding is begun by tying the twine about 3in. from the bottom of one stake and winding it upward until the height desired is reached. The top round need be only from 12in. to 15in. above ground level and each round from 4in. to 5in. apart. The twine should last and retain its smell for at least 2 years. This method also allows hand weeding and cultivation to be done satisfactorily.

CHOOSING FRUIT FOR SHOWS

Many home orchardists are sufficiently interested in their crops to enter the best fruit in local horticultural shows, a practice of value to both the grower and the public.

When fruit is being selected for shows uniformity to the stated size is essential. For apples and pears in culinary fruit classes ½in. difference in diameter is allowed between fruits, but in all other classes the margin is 1/16in.

In stone fruits no such restriction of size is set, and in all kinds of stone fruit, sizes above the average for any particular variety should be chosen. However, care should be taken not to overdo this, or points could be lost on excessively large fruits.

Citrus fruits have definite size standards, which are as follows:—

Lemons: 2⅝in. to 2¾in.
Oranges: 2¾in. to 3in.
Grapefruits: 4in. to 4½in.

Citrus specimens selected should be as uniform as possible for size, shape, colour, and maturity.

The shape of the fruit should be characteristic of the variety and if the exhibitor has doubts as to the true shape of a variety owing to variations in his crop he should seek advice from the nearest Department of Agriculture office where there is an officer of the Horticulture Division. Many public libraries have publications with illustrated descriptions of fruit varieties.

Coloured fruits have special problems. Too much colour may be considered a defect. Colouring above that characteristic for a variety is very often a fault of home orchard exhibits, and though there is some variation in this respect, according to the judge, colour characteristics should also be determined as for fruit shape.

The natural bloom of fruit should be left if possible when showing, but if heavy spray residues are visible, it is much better to rub the fruit clean. Bloom smudged when handling should

Te Kauwhata Wines

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MADEIRA, PORT, APPLE

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(CLARET TYPE)
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4.7C

POINTS ALLOCATION FOR APPLES (PLATE LOTS)

	Single plate lots		Collection of plates	
	Dessert	Culinary	Dessert	Culinary
Size and uniformity	15	15	15	15
Form	5	5	5	5
Condition and flavour ..	30	—	20	—
Condition and cooking quality	—	40	—	30
Colour and appearance ..	35	25	25	15
Freedom from blemish ..	15	15	15	15
Market value	—	—	20	20
	100	100	100	100

POINTS ALLOCATION FOR PEARS (PLATE LOTS AND COLLECTION OF PLATES)

Form, size, and uniformity	15
Quality and flavour	25
Condition and appearance	20
Market value	20
Freedom from blemish	20
	100

POINTS ALLOCATION FOR STONE FRUITS

	Plums	Peaches nectarines, apricots, cherries
Size	20	15
Form	5	5
Uniformity	10	10
Colour and appearance	25	30
Freedom from blemish	15	15
Condition and quality	25	25
	100	100

be rubbed off, but if it is unmarred, it should be left on. This applies especially to plums, cherries, and grapes. All specimens in a group should be treated in the same manner so that their appearance is uniform.

Market value is often considered when collections of varieties are exhibited, and for such collections the popularity of the variety on the market and the condition of the fruit should be combined when the fruit is selected.

The selection of fruit for showing should begin early in the growing season. Protection against insect pests and diseases must be given by spraying carefully throughout the season. Particular attention should be paid to thinning to help achieve the required size.

During all operations the fruit must be handled carefully to avoid bruising or other damage. All exhibits should be carefully and neatly labelled according to the schedule. Schedules must be read carefully to ensure that the fruit is exhibited to the requirements of its class.

The tables above showing how points are allocated by judges for the various characteristics of fruit will be a guide for exhibitors in the selection of specimens for plate collections.

BERRY FRUITS

In the berry fruit section of the orchard pruning of raspberries can begin. The old canes should be cut out as soon as all the crop has been harvested. This diverts all the vigour of the plant to the production of new canes for the following season.

Strawberry fruit may be affected by botrytis (grey mould) if the weather is humid or if the plants have excessive leaf cover. Fruit infected with this disease is covered with a grey, fur-like mould and should be picked and put in a separate container to be destroyed. If it is left on the plant or nearby, the spores from the mould will increase the amount of infection throughout the bed.

Spraying has little effect against this fungus, as the increase in local humidity from the spray offsets any effect of the therapeutant. Picking a few of the larger and older leaves from the bottom of the plant and also the removal of any dead leaves and plant litter which may obstruct the flow of air are often a help. Weed control is also essential if the incidence of mould is to be kept as low as possible.

Currant Eelworm

Earlier in the season bud failure may have been noticed on black currants, especially in the variety Cotswold Cross. This may be caused by the currant eelworm.

Currant eelworm is a microscopic nematode that invades the tissues of the bud, completely destroying them, but it is difficult to notice during the winter while the buds are dormant. It is not until the plant is growing that failure of infected buds becomes evident.

Control

Control of this pest is difficult. The eelworm lives within the tissues and cannot be reached by sprays. All infested branches should be removed and burnt as soon as the symptoms are noticed in spring, as only if this is done can the pest be kept in check.

Silverleaf

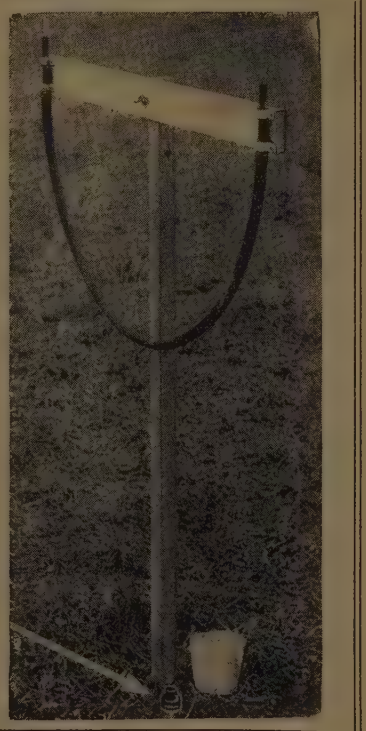
Silverleaf disease is fairly common in currant bushes throughout New Zealand. Infection is caused by the entry through pruning cuts and other wound surfaces on the plant of spores produced on flat, leathery, purple, disc-like fructifications which are frequently found on logs of willows, poplars, and many other types of trees, as well as on the dead wood in the base of currant bushes.

Control

The only control is the removal and destruction of infected bushes and removal of sources of infection such as stumps, branches, fallen logs, or other susceptible hosts bearing fructifications of the causal organism.

A Sighting Level for Land Drainage

A SIMPLY constructed sighting level for land drainage is illustrated at right. A piece of tubular, open-ended glass is inserted in either end of about 5ft. of hose, which is filled with water to within 2in. of the top of the glass. A drop or two of ink in the water in the glass darkens the surface of the water enough to give a good sight. The thumb screw on the T wooden frame allows adjustment during sighting and fixing of the horizontal arm when a sight has been secured. A graduated stick marked in feet and inches and fitted with a sliding target is used in conjunction with this level.



Photograph by Niederer.

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Dalapon Dowpon a new selective grass-killer for the control of grass weeds in lucerne crops and for the eradication of couch; effective against cocksfoot, Yorkshire fog, browntop, ryegrass, poa annua and other grasses.

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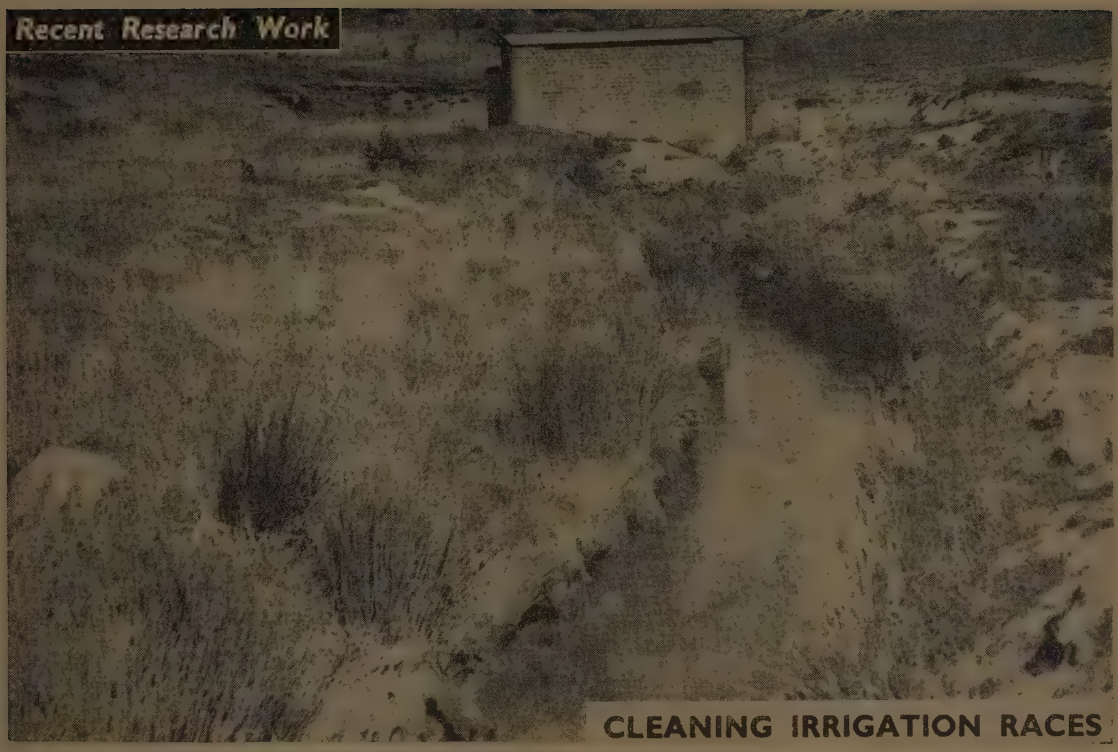


CLEANING IRRIGATION RACES

SINCE investigations began some seasons ago with different types of weedkillers to control weeds in irrigation races the accent has been on the use of monuron (formerly CMU) and dalapon as the basis of control.

INITIAL work (see "Journal of Agriculture" for March 1956, page 227) gave the impression that monuron would have to be applied earlier in the season than it had been if the best were to be made of this material. This contention was subsequently confirmed, and in comparison with TCA and polyborchlorate monuron was found to be superior.

MONURON

The rate of application of monuron at this stage of the investigation was 25lb., 50lb., and 75lb. per acre, applied during late July and early August. The weeds were mainly perennial ryegrass, browntop, *Bromus sterilis*, storksbill, and *Poa annua*, which under normal circumstances will provide a dense mat of foliage, retarding the flow of water. All applications were effective and showed conclusively that control for two seasons is possible, with reasonable control extending into the third season.

For ease of handling, monuron is superior, but with these relatively high rates and long periods of control certain difficulties arise. With the denudation of the shoulders of the race stock break down the banks and help to fill in the race. It is essential to have steep banks well clothed down to the water level; otherwise breaks could occur with possible erosion. With these results and difficulties under consideration investigative work was carried out with lighter applications of monuron and dalapon and with ATA as an activator, applications being confined to the bottom of the race and the sides up to the normal water level.

MONURON AND DALAPON

Monuron and dalapon were compared at rates of 5lb., 10lb., and 20lb. per acre. In all cases dalapon compared favourably with monuron, but regrowth density was greater with dalapon, more particularly at the lower rates. The preferred treatment was monuron at 20lb., but for seasonal control in this type of race 5lb. of monuron would be satisfactory. Races built in heavier soil, where grass growth would be stronger, would require up to 10lb. of monuron for seasonal control.

MONURON AND DALAPON WITH ATA

A recent trial in which ATA was used in conjunction with monuron and dalapon has given a distinct response, the kill of weeds being increased. The rates were 5lb. of ATA with equivalent amounts of monuron or dalapon. The results with the addition of ATA were very good, increasing the effectiveness of both dalapon and monuron and giving more lasting control of grasses, clovers, and weeds in the race.

Monuron and ATA were so superior that a combination of these in equal proportions can be recommended for this work.

Owing to considerable variation in race conditions it is not possible to state definitely the quantity of material to apply, but by using monuron at 5lb. to 10lb. per acre, or more effectively with ATA in equal quantity, effective control of grassy weeds in irrigation races can be obtained.

—*R. C. SCHOFIELD*

Frequent hoeing before weeds are seen will kill many germinating weed seeds. Sparrow photo.

There is no substitute for hand weeding in a border full of flowers. Weeds should be collected and carried away, not left on the surface to seed. Sparrow photo.

Weed Control in the Flower Garden

A WEED has been defined as a plant out of place. Though brief, this definition is very apt, as a weed in one part of the country may be a desirable garden plant elsewhere. In this article J. P. Salinger, Horticulturist, Department of Agriculture, Wellington, describes methods of weed control in the flower garden. Notes on routine garden work for December are by Rosalie A. Campion, Horticultural Instructor, Department of Agriculture, Wellington.

A GARDEN looks well cared for not only when the lawns are closely mown and the hedges neatly clipped but by an obvious absence of weeds. The mild climate in most parts of the country encourages weeds to grow at the same time as garden plants, and the gardener must make the control of weeds a continuing operation.

Weeds can be controlled by cultivation or by the use of chemicals; in a mature flower garden it is seldom possible to use chemical methods except in areas such as lawns or paths; elsewhere, in flower beds and borders, hand work or mulching is the only answer.

CONTROL BY CULTIVATION

Flower Beds and Borders

It is most important in flower beds and borders to control underground parts in perennial weeds such as docks or couch and prevent seeding in flowering weeds such as groundsel or fat-hen.

Perennial weeds which have a taproot or a creeping root from which stems arise are best dug out with a trowel or border fork; these parts should then be burnt in a really hot fire. If thrown on a smouldering rubbish fire, parts of the roots may still be alive in the ash and so returned to the garden. They should never be composted.

Annual weeds which flower and seed freely in the space of a few weeks should be hoed off in dry weather before they flower; or in wet weather they should be pulled out. Many gardeners use special, small hand tools for this purpose made of bent wire, and the plants when pulled out should not be left lying on the soil but placed directly in a rubibsh tin or on a piece of scrim. Especially in winter or in wet weather weeds which are left on the surface will quickly root again and flower and seed.

Provided the plants are not already seeding, they may be composted in a well-made compost heap. If they have reached the seeding stage, it is better to dry and burn them, or in quantity they may be dumped in a tip. They should not be thrown on an adjacent vacant section or on the seashore, as from these places they will multiply and cause trouble to other gardeners.

One of the most efficient methods of weed control in flower borders is to cultivate the soil regularly before weeds are seen. Weed seeds are germinating or weed roots are growing during the whole year and hoeing of an apparently weed-free surface will expose many germinating seeds which will soon die in a few hours of sunshine or dry weather.

Mulching

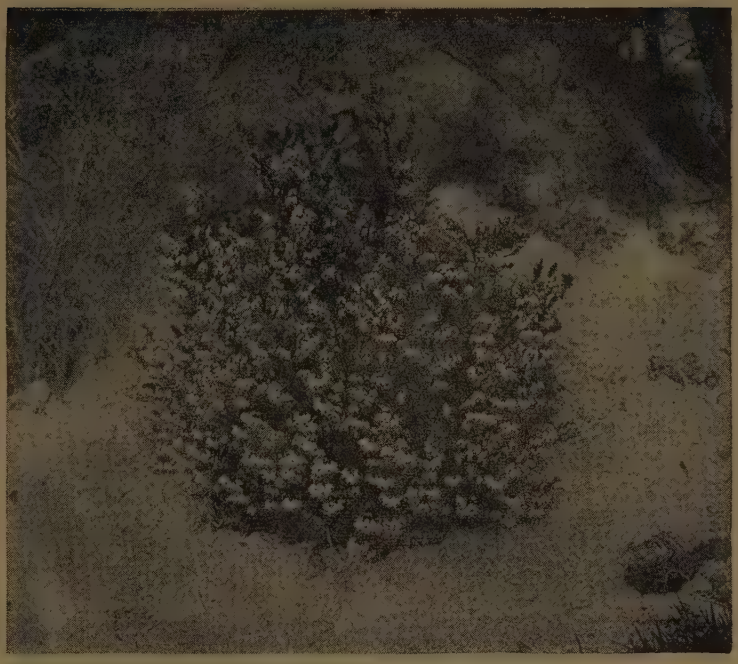
Inert materials such as sawdust, leaves, and pine needles are most useful for suppressing weeds. It is important that all weeds should be removed before the mulch is applied; any which appear subsequently can be easily pulled out. Permanent mulching of trees and shrubs with these materials will save a great deal of work and also benefit the plants themselves.

Other materials used for mulching such as lawn mowings, compost, or farm manure may in fact introduce weeds. It is common to find docks growing after the use of sheep manure, or grass weeds after lawn mowings have been used. However, the benefit obtained from mulching with these materials may outweigh the disadvantage of introducing weeds.

A mixture of lawn mowings or manure with sawdust makes an excellent mulch, providing plant foods at the same time as it reduces the number of weeds.

Where a new flower bed is cut out of a lawn or a grass berm is cultivated thin turves of grass cut off the area before the soil is dug can be used as a mulch under shrubs. These turves should be placed grass downward and if applied in early summer, dry weather soon kills the grass, but the fibre mat of old grass provides a good protective layer to the soil. Occasional weeds growing from these turves can be hoed off.

WEED CONTROL IN FLOWER GARDEN



Mulching flower beds and shrubs with sawdust will suppress many weeds.

CHEMICAL WEED CONTROL

Chemicals used for weed control can be classed as non-selective, partially selective, or selective.

Non-selective Weedkillers

Non-selective weedkillers are those which are used to kill all vegetation in paths and waste areas. Those sold by seedsmen are composed basically of one or more of the following chemicals: sodium chlorate, borax, or urea. Gardeners sometimes use other materials such as agricultural salt, diesel fuel oil, or waste sump oil, but the materials specially manufactured for this purpose are more satisfactory. To obtain complete suppression of all vegetation most of the materials need to be applied at comparatively heavy rates, from 1oz. to 4oz. per square yard.

Arsenical weedkillers though efficient should not be used, as other weedkillers are equally as suitable and are non-poisonous.

Partially Selective Weedkillers

Partially selective weedkillers are used primarily to control certain plants such as grasses, but if used under unsuitable conditions, will also affect desirable plants.

Two materials can be used for grass control, TCA and dalapon. TCA can be used for the control of creeping grasses such as twitch (couch) in waste areas or in ground which is to be used later for flower beds or borders. It should not be used among growing plants and should be applied to the soil after cultivation when the grass roots have been activated by cultivation, so that it can be absorbed by the plant roots.

Dalapon will control fibrous rooted grasses in waste areas and under established trees, shrubs, and hedges when correctly applied. In contrast to TCA it is absorbed by the leaves of the grasses and will damage other plants if allowed to penetrate the soil. Dalapon should be applied in fine weather and with only sufficient water to wet the leaves of the grass plants.

Another type of partially selective weedkiller, at present available only in commercial quantities, is based on the principle of affecting the germination of seeds. Two of these weedkillers, applied at very low rates, are CIPC and monuron (formerly known as CMU). They are sprayed on to recently cultivated soil among established plants such as bulbs or shrubs. They will not control weeds such as buttercups or twitch arising from perennial roots, so that these should be individually removed when they appear. After the weedkiller is applied the soil should not be cultivated until fresh weed seeds germinate in quantity. Both these materials should be used at rates of 1lb. to 4lb. per acre (1oz. to 300 square yards to 1oz. to 75 square yards).

Selective Weedkillers

Hormone weedkillers, though correctly known as growth regulating weedkillers, can be considered selective. When used correctly they will control broad-leafed weeds, but not affect established grass or shrubs, or control shrubby weeds with little effect on broad-leafed plants or grass. The essential feature of these materials is that only minute quantities need be applied to the leaves of susceptible plants to kill them. For this reason they must always be used with great care and applied by equipment specially reserved for this purpose. Careless storage, handling, or application of hormone weedkillers can cause damage not only to all parts of the garden, but also to neighbouring properties.

Types

The parent materials now available are commonly referred to by initials and are known as MCPA, 2,4-D, and 2,4,5-T. Chemically these are acids and when formulated as weedkillers they are sold as esters, amines, and salts. The actual concentration of the parent material is expressed as the acid equivalent and the rate of use is given as "lb. acid equivalent per acre". For instance proprietary forms of 2,4-D

Clover can be eliminated from turf by the use of 2,4,5-T weedkiller. Broad-leafed weeds can be controlled by the use of MCPA weedkiller. The two materials can be combined to give a weed-free turf.

amine may be purchased with 1lb. to 4.8lb. of "acid equivalent 2,4-D".

The materials are obtainable as volatile and low volatile formulations. Gardeners should always use the low volatile forms, as even the fumes of volatile types can cause plant damage. When low volatile forms are used the dilute material should be applied in the early morning when there is little or no wind, so that spray drift can be avoided.

Detailed recommendations cannot be given for all makes and types of hormone weedkillers now on sale. The maker's recommendations should always be followed, as stronger concentrations or heavier rates of application are unlikely to be more effective.

Applying and Cleaning Equipment

Where weedkillers of any type are used in quantity they are usually sprayed on with special spraying equipment. In the home garden it will usually be as easy, and produce less spray drift, if the weedkiller is watered on to the lawn or path through a fine-rose watering can. The most important feature of chemical weed control is to apply **the correct amount of weedkiller per square yard.** In general the amount of water used to dilute the weedkiller is less important provided excessive quantities of water are not used.

It is very difficult to remove all traces of weedkiller, especially hormone types, from garden sprayers. The material soaks into the rubber or leather washers. Even dilute quantities of hormone weedkillers will affect the growth of susceptible plants such as roses, tomatoes, and grapes.

The sprayer should be cleaned out by rinsing thoroughly with cold water to which household detergent has been added, with a solution of ¼ pint of ammonia to 2 gallons of water, and again with cold water. The water used for cleaning the equipment should be poured down a drain.

Preferably a separate watering can or sprayer should be reserved for applying weedkillers and should be clearly marked so that it cannot be confused with other equipment. They should always be washed out after use. Plastic hoses are easier to clean than rubber.

Storing Weedkillers

Weedkillers of all types should be stored separately from fertilisers, horticultural sprays, and seeds. This will ensure that the different materials are not confused; also that weedkiller fumes or spilt materials will not affect other materials.

Use of Weedkillers

Weedkillers have only a limited use in the flower garden and can be applied for the following purposes:—

1. On a new section to control shrubby weeds and clean the section.
2. On an established section on paths and drives.
3. On an established section to control weeds on steep grass banks.
4. To control weeds in lawns.

Hormone weedkillers should be applied to the turf with a fine-rose watering can as growth begins in spring and again in autumn if necessary.

SHRUBBY WEEDS ON NEW SECTIONS

New sections are frequently covered in gorse, broom, blackberry, or manuka. Burning off established plants where they are growing can be very dangerous, especially in areas where there is only a tank water supply.

Better methods of clearing the section are as follows:—

1. Bulldoze or cut down the scrub, pile all the top growth in one area, and burn. In some areas it may be necessary to obtain a permit from the local authority before any rubbish is burnt. The seedlings or regrowth from the bases of old stumps should then be sprayed with 2,4,5-T in diesel fuel oil. This spray should be directed at the bases of the plants.

2. When the plants are growing strongly or in the case of blackberry, when in flower, the whole plant should be sprayed with 2,4,5-T at 2lb. to 3lb. acid equivalent per acre. This will kill all the plants and there should be no regrowth from the base. Once the tops are dead they can be collected into one area of the section and burnt.

This method requires more water and there is more danger of spray drift to neighbouring properties or to desirable ornamental shrubs or hedges. A cone-shaped shield bent round the nozzles will reduce spray drift.

PATHS AND DRIVES

Non-selective weedkillers should be used for this purpose, and the

materials which can be purchased are based on sodium chlorate, borax, and urea.

Arsenical herbicides are not recommended because of their poisonous properties.

Sodium chlorate as a pure chemical presents a fire hazard, but when sold in proprietary weedkillers it is mixed with other chemicals which reduce this risk. At rates of 1oz. per square yard these materials will kill all top growth, though there may be regrowth from perennial plants. At 4oz. to the square yard an effective and persistent kill of weeds is obtained.

Materials based on borates, some of which also contain sodium chlorate, provide satisfactory control of all vegetation at about 4oz. per square yard.

The compounds based on urea have only recently been developed, but should prove useful for the complete control of weeds. Two materials are available at present are monuron and diuron (formerly known as DCMU). For this purpose they should be used at up to ¼oz. to 1 square yard. As these materials do not dissolve in water, but remain in suspension, it is important that the solution should be well agitated when it is being applied.

Precautions

These materials should be used only where all vegetation is to be killed and the ground kept free of all plant growth for a considerable period. They should be applied with only sufficient water to soak into the surface, so that excess solution does not run off the area.

They should not be used in areas where roots from trees or shrubs are likely to penetrate the treated soil, as these plants may absorb the weedkiller and suffer damage. In such cases it will be necessary to hoe off the weeds regularly or use these materials in a much more dilute form so that they do not penetrate into the soil in toxic quantities.

STEEP GRASS BANKS

In many gardens, especially those on hilly sections, there are areas which are best kept in grass which is cut two or three times a year. These areas are frequently invaded by weeds such as onion weed (*Allium vineale*) or "mile-a-minute" plants (*Tradescantia* spp., *Vinca minor*, or *Senecio mikanoides*).

Many of these weeds have a waxy surface to the leaves, but are susceptible to 2,4-D preparations when mixed with diesel fuel oil or kerosene, which aids penetration. The type of 2,4-D known as low volatile esters should be used and these should be added to a mixture of equal parts of diesel fuel oil or kerosene and water. Repeat applications may be needed, and should be applied early in the season and when the weeds are growing strongly; a sprayer which produces fine droplets should be used.

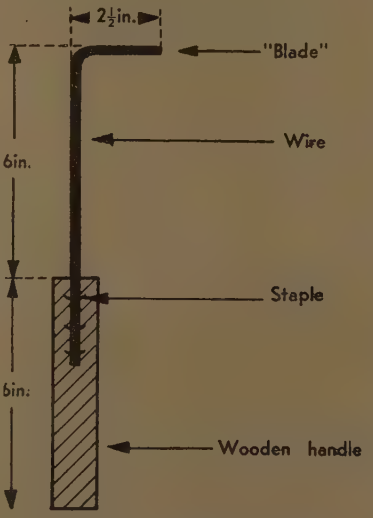
LAWNS

Selective hormone weedkillers are particularly suitable for weed control in lawns. MCPA has proved most satisfactory for control of broad-leafed weeds and causes the least damage to the fine grasses.

For the control of clover 2,4,5-T preparations should be used and a combination of these two materials can be applied to established turf to obtain a completely weed-free area. A combination of 1 part acid equivalent MCPA and 2 parts acid equivalent 2,4,5-T should be applied in spring and autumn. Once the clover is eliminated MCPA by itself at low rates will suppress the other weeds, especially if the grass is kept growing strongly by adequate manuring with the 3 : 1 sulphate of ammonia/superphosphate mixture.

"Spot" Application

In a well-maintained turf there may be only a few undesirable weeds, so that it is not necessary to apply weedkiller to the whole area. The weeds should be treated individually by "spot" application. Weedkiller is mixed at the recommended dilution with water and each weed is brushed with the solution on a soft paint brush. Care should be taken that excessive quantities of the weedkiller are not applied to individual plants.



A useful hand weeding tool can be made from No. 8 fencing wire bent to an L shape and fixed to a wooden handle. The wire shaft should be about 6in. long and the "blade" 2in. to 2½in. long.

CONTROL OF COMMON WEEDS

In each district there are plants which are locally abundant and become weeds, but there are certain plants which are weeds in most parts of the country. The section following sets out the most satisfactory method of control, whether mechanical or chemical, of common weeds.

Broom, Brambles, and Blackberry

Cut down and burn tops; grub out roots. **Or**

Spray when plants are in flower with 2,4,5-T at 2lb. to 3lb. per acre acid equivalent; obtain complete coverage.

Bracken Fern

Cultivate the ground and improve fertility.

Buttercups

In lawns use MCPA weedkillers.

In flower beds hoe off and burn.

Cape Tulip

A poisonous bulbous weed. Report its presence to the Department of Agriculture.

Capeweed, Chickweed, Cleavers (Goosegrass)

Keep soil cultivated to destroy seedlings. In moist weather hoe off and burn.

Clovers

In lawns use 2,4,5-T weedkillers. Increase acidity of turf by using acidifying fertilisers such as sulphate of ammonia.

In flower beds cultivate and remove plants.

Convolvulus (Bindweed)

Repeated applications of 2,4-D weedkiller may be brushed on to the twining shoots.

Couch or Twitch

In flower beds fork out frequently and burn.

Among shrubs apply a heavy mulch of sawdust and fork out from this.

In waste areas use TCA weedkiller in conjunction with cultivation when plants are growing strongly.

Or use dalapon.

Docks

In lawns control by spot application of MCPA or 2,4-DB weedkiller to young plants. Repeat if necessary.

In flower beds pull out and burn.

Fumitory, Fat-hen, and Groundsel

Cultivate to control seedlings. Pull out older plants.

Grasses, Fibrous Rooted

In flower beds cultivate and remove.

Among shrubs, etc., remove and apply mulches. Possibly controlled by dalapon.

In waste areas use non-selective weedkillers at heavy rates.

Gorse

Dig out and burn. **Or**

Cut down and spray bases of plants with 2,4,5-T plus diesel fuel oil. **Or**

Completely spray plants with 2,4,5-T in water. Precautions must be taken again spray drift.

Regrowth seedlings can be pulled or dug out.

Inkweed

Cultivate to control seedlings. Pull out and burn older plants.

Kikuyu Grass

Among grasses, no control without damage to other grasses.

In waste areas use dalapon.

Mallow (Creeping)

Cultivate and remove plants. In lawns use MCPA weedkillers.

Mile-a-minute Plants

Most of these plants can be controlled with 2,4-D weedkillers plus diesel fuel plus water. If cut down, burn the top growth, do not compost it.

Mint

Fork out and burn, then mulch with sawdust.

Apply 2.4-D by spot application.

Grow mint in a restricted position.

Nightshade (Black)

Hoe off regularly before flowering.

Onion Weed

In cultivated areas keep cultivating and dig out and burn the bulbs.

In waste areas use 2,4-D plus diesel fuel oil plus water at early stage of growth, or 2,4-D plus diesel fuel only when plants are flowering. Repeat applications are needed.

Oxalis

There are at least three different species arising from bulbs which are weeds. Two fibrous rooted species are also weeds.

For fibrous rooted types hoe off regularly.

For bulbous types there is no chemical control yet.

Research is being actively pursued on control of this weed.

Dig out clumps of bulbs when seen; do not try to shake off the soil. Bulbs can be burnt in a hot fire or fed to poultry.

Paspalum

In lawns no control among finer-leafed grasses. It is best to make a paspalum lawn in warmer areas.

In waste ground use dalapon.

Portulaca

Hoe off and burn; do not leave plants on surface or compost them.

Poa annua

Poa annua is a troublesome weed in winter. Pull it out and compost in well-made compost heap. No control in turf except by increasing acidity.

Pimpernel, Red-root, and Speedwell

Cultivate to control seedlings; in moist weather remove from soil.

Spurrey

Commonly appears in newly sown lawns; disappears with mowing and feeding.

Sorrel

Repeated cultivation and removal of foliage and roots. Burn these. No chemical control.

Thistles

Repeated cultivation; dig out and burn all pieces of Californian thistle roots.

Twitch (Couch)

Twitch (see couch).

Water Hyacinth

A dangerous weed in ponds and waterways; immediately inform the Department of Agriculture if any plants known or found.

Willow Weed, Yellow Weed

Both are controlled by cultivation when plants are young.

TREES AND TREE STUMPS

Most trees can be killed by ringing the trunk; that is by removing a band of bark about 2in. wide right round the trunk. With trees like willows and poplars it is advisable to dress this area with a mixture of 2,4-D and diesel fuel oil.

There is no satisfactory method of rotting or destroying tree stumps quickly. On a new section it is worth using machinery to shift the tree stumps or pull over the tree before the top is cut. On a mature section they can be removed only by hand work and chopping up.

Stumps remaining in the ground can often be used as features in the garden if covered with climbing plants such as climbing roses or clematis. Stumps can be gradually destroyed by burning out. In this process holes are bored in the trunk and filled with saltpetre (nitrate of potash). The holes are refilled two or three times and then kerosene is poured over the stump and a fire lit on top of it. The wood then burns or smoulders for some time and can eventually be chopped away; in general, though, tree stumps should either be removed when the top is felled or retained as a garden feature.

Work for December

December is an encouraging time for gardeners, as new flowers begin to open and flower buds form. As new varieties bloom, make notes for future reference of those which you wish to grow again next season.

Mulching

During December gardens dry out fairly rapidly, so that those intending to be away from home for the holiday period should give extra attention to the flower garden before they leave. One of the best methods is to apply mulches which keep the plant roots cool and help conserve the moisture by cutting down soil evaporation. They should never be applied to dry soil. When available, stable manure is the most favoured for use round roses, but compost, spent hops, and cow or sheep manure may also be used.

Ericaceous plants such as rhododendrons, azaleas, ericas, and kalmia, as well as other shallow, fibrous-rooted shrubs could be mulched with sawdust to a depth of 2in. to 3in. A dressing of sulphate of ammonia at 2oz. or blood and bone at 4oz. per square yard should be mixed with the mulch to feed the bacteria with nitrogen; they will then begin to act on the sawdust and convert it into humus.

Sawdust is the most readily available and cheapest mulching material in New Zealand and could be more widely used. It is not likely to make the soil more acid as may be supposed. As with all humus it will improve the condition of the soil; heavy soils will become lighter and more easily worked and lighter soils will have an increased capacity for holding water and nutrients.

All flower beds may be mulched with a 1in. layer of sawdust once the plants have become established. Watch for nitrogen starvation and apply a side dressing if necessary. If applied to clean soil, the mulch will help to reduce the growth of weeds. Whenever the leaves of mulched plants become light green or yellow it may be a sign that they require more nitrogen.

Liliums

Lilies are a group of plants which appreciate the extra humus and cool

▲ Continue the routine spraying of roses and other ornamental plants against pests and diseases. Care should be taken that the spray reaches the under sides of the leaves.

▲ Flowers past their best should be regularly removed before the seed pods (hips) form. Cut rose stems back to a plump bud near a mature leaf.

conditions provided by a sawdust mulch. As the earlier varieties are developing attention should be given to staking, especially where bulbs are young and the stems weak. When the stems are 1ft. high insert a stake about 4in. from the stem and make the first tie.

Lilium regale is deservedly popular for providing blooms at Christmas and for this reason deserves to be grown in every garden. It is easily raised from seed and will flower in the second year. This is a decided advantage, as it allows quick replacement of any lilies which have to be destroyed because of lily mosaic infection.

Many lilium varieties are infected by lily mosaic virus, a disease which is not perpetuated through the seeds. The virus causes light and dark striping of the leaves, producing a mottling effect. Yellowing, scorching, and distortion of the leaves are common and the flowers may be stunted and twisted. It is not possible to detect the disease on the bulbs. Infected plants should be burnt immediately to prevent aphids from carrying the disease to healthy plants. Spray the plants regularly with lindane to eliminate the aphids. If brown spotting occurs on the leaves, this will probably be due to the fungous disease *Botrytis*, and copper or thiram sprays should be applied.

Roses

Climbing roses will by now be sending out vigorous new shoots which should be carefully tied in to avoid damage by the wind. It is from growths of these vigorous shoots that the best of next season's blooms will develop.

As rambler roses of the American Pillar type finish blooming, the old flowering growths should be completely removed at the base of the bush. They do not flower again and removal allows light, space, and air for the development of the new shoots.

As the blooms of all bush roses fade they should be removed each week. Use sharp secateurs and cut back to a fat side-bud from which another flower should develop. All blind shoots should be cut back similarly. At this time of the year blooms should be cut while in tight bud. If the stems are recut under water and placed up to their necks in a bucket of water for 2 to 3 hours, they will last well when arranged.

Spraying

A sharp lookout must be kept for diseases and pests and sprays and dusts applied accordingly.

Mildew

Mildew is recognised by the presence of a white powdery substance and distortion on sweet peas, roses, delphiniums, verbenas, asters, zinnias, and hydrangeas. (For control see Rust.)

Rust

Rust is seen as groups of spores having a yellow to brown spotting effect, mainly on the under sides of the leaves. In New Zealand roses, chrysanthemums, geraniums, and hollyhocks are often completely defoliated and carnations are often damaged.

Both mildew and rust fungi can be controlled by spraying as soon as noticed and at 3-weekly intervals with a combination of:—

3 fl. oz. of lime sulphur plus 1½oz. of colloidal sulphur to 4 gallons of water.

Black Spot of Roses

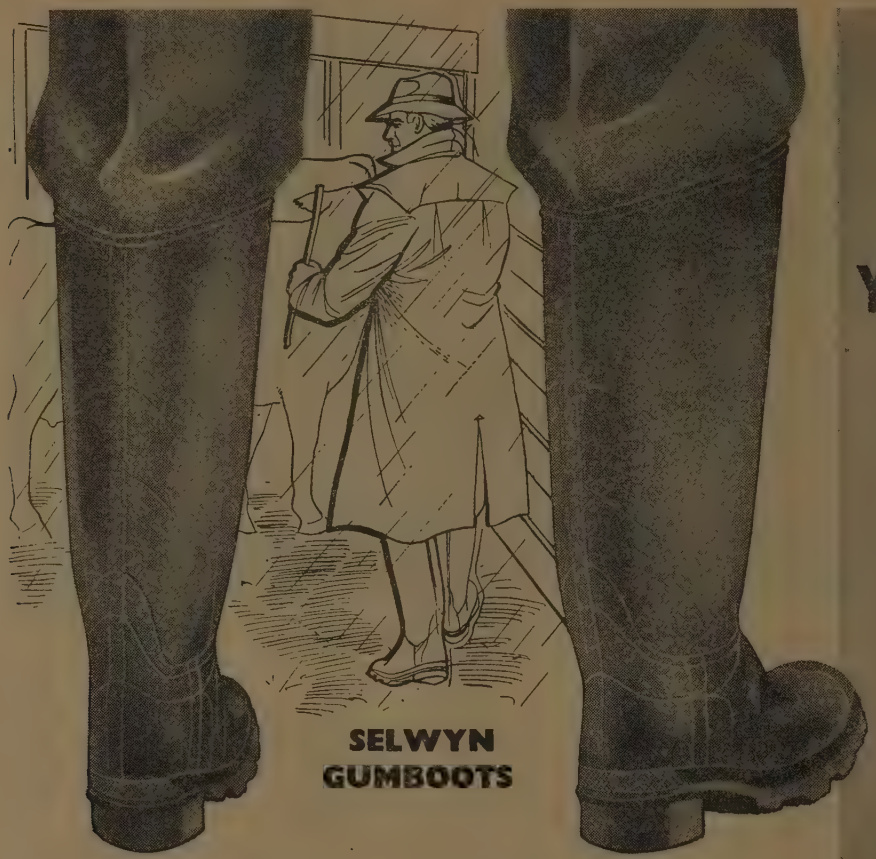
This will be seen on roses as black spots which increase in size and may cover the whole leaf area, especially when the leaves are kept wet with rain or overhead watering. Use copper or thiram sprays to control this disease.

Aphids

Aphids, often known as greenfly, will be easily recognised on a wide range of plants. They are usually seen near the growing points, where they smother out the light and air and weaken the growths by sucking out the sap. Their numbers will be rapidly increasing at this time. Sprays of lindane, malathion, or nicotine sulphate should be applied regularly.

Narcissi Bulb Flies

Narcissi bulb flies, the larger of which resemble a bumble bee, will be hovering round this month. If the bulbs which have been lifted for division are left lying about, the flies will



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Marathon
BY SKELLERUP

GUMBOOTS

lay their eggs on the necks of the bulbs. Dust the bulbs with DDT while they are drying. Bulbs which are in the ground should be sprayed at ground level twice this month with 1oz. of DDT wettable powder to 6 gallons of water.

Thrips

Thrips are very small insects which suck the sap from the leaves and give a silvery appearance to rhododendrons, azaleas, japonica, lauristinus, fuchsias, gladiolus, and other plants. In gladiolus the flowers may even become flecked with white markings or become distorted and fail to develop. Sprays of 1½ fl. oz. of DDT emulsion to 4 gallons of water should be applied at the first sign of thrip damage.

Chrysanthemum Gall Midge

Chrysanthemum gall midge is one of the newer pests which is making an appearance on the foliage, stems, and buds of chrysanthemums. It will be seen as raised cone-shaped galls which contain the midge and often are so thick that they prevent the flower buds from opening. Preventive sprays of nicotine sulphate at 1 fl. oz. to 2 gallons of water should be applied weekly.

Gladiolus

Early flowering gladiolus may be lifted for drying when 6 weeks of after-flowering development is completed.

This year bulbs planted between Christmas and New Year should make a good display at Easter. Planned planting can be most rewarding. Prepare the soil well by incorporating any available organic matter and plant a little deeper than for the early plantings so that the bulbs will not lack moisture.

Chrysanthemums

During the first 3 weeks of this month chrysanthemums for autumn flowering should be given their second stopping. This entails the removal of the growing point to encourage the development of several side shoots which will bear the flowers. Stake and tie the plants as required. Keep the plants well watered in dry weather and apply a side dressing now at 2oz. per square yard of the following mixture:—

Sulphate of ammonia, 2 parts by weight
Sulphate of potash, 1 part by weight
Superphosphate, 2 parts by weight

Bearded Iris

Immediately after flowering is the most desirable period for transplanting bearded irises so that they can become well established and give a good display at the next flowering season. If planting cannot be done by the end of this month, it should be delayed until early March, when the plants usually have a further short period of growth. Transplanting between these periods usually results in inferior rooting and reduced quality of blooming in the first season. Request an early delivery of plants from the nursery.

Irises are not gross feeders, but the soil should be enriched with superphosphate at up to 4oz. per square yard before planting. To prepare the plants for planting snap off the outer, vigorous fans and remove the top half of their foliage. Scoop out a shallow depression and set the rhizome on the rim of this, spreading the fibrous roots over the depression. Firm the soil back over these roots and round the rhizome. This should result in the fibrous roots being deeply settled and should ensure that only the top surface of the rhizome will be showing when the soil has consolidated after rain. A site which will allow the irises the unshaded heat of the sun in summer is preferable to mature spring growths and will ensure future blooming.

Applying a mulch of sawdust to a rhododendron. The mulch should be spread to the limit of the branches.

General Work

Lawns should be given their routine 3-monthly dressing of fertiliser at this time. A dressing of 1oz. per square yard of a mixture of 3 parts by weight of sulphate of ammonia and 1 part by weight of superphosphate should be applied, preferably when the morning dew is on the leaves or in moist weather. A pinch of sulphate of ammonia should be placed on the crown of any persistent flat weeds to kill them out.

Attend to the staking of dahlias and apply a side dressing of a mixed fertiliser toward the end of this month. Where exhibition blooms are desired disbudding should be done.

Tulips may be lifted now, but where the bulbs are planted deeply in heavy soil this will be necessary only every second year.

Perpetual carnations can be cut back after flowering to produce young, vigorous growths and to keep the plants compact. If new plants are required, carnations may be layered this month.

Where space is available a few anemones can now be planted for early flowering.

Continue the staking and tying of plants, especially in the herbaceous border. If desired, heleniums may be stopped in the same way as chrysanthemums.

Fork or lightly hoe over the beds of annuals and if the plants lack vigour, give side dressings of a balanced fertiliser. Do not let the flower beds dry out or give frequent sprinklings. It is more desirable to soak the ground thoroughly occasionally and thus send the roots of plants to the lower and cooler soil, where they will encounter fresh nutrients.

Growths of wistaria which are not required to form the main framework can be cut back to within 6 buds of the main stem, where they will be encouraged to form future flower buds.

Continue sowing seeds of shrubs, biennials, and perennials. Be sure that young seedlings do not dry out as the temperature increases. Seed of cinerarias for flowering next spring can now be sown.

Cuttings of cacti and succulents can still be taken. These plants can now be watered quite liberally and a watch should be kept for the white fluffy mealy bugs. Methylated spirit applied with a paint brush is an easy method of eradication.

Pot plants should be regularly given a balanced liquid feed to keep them growing steadily. An occasional watering with soot water will be found beneficial. Sponge down any leaves which are dusty and dull.

A small batch of freesias could now be potted up for early flowering inside.

Christmas Decorations

So now is come our joyfull'st feast,
Let every man be jolly,
Each room with ivy leaves is drest,
And every post with holly

—George Wither

By ELEANOR COUSTON and MARY HUNT,
Home Science Extension Officers,
Department of Agriculture,
Christchurch

THROUGHOUT the ages many customs have arisen to celebrate the most beautiful season of all, Christmas-tide. This year once again Christmas stories will be read, carols sung, and gifts exchanged; and families and friends will gather to commemorate the birth of Christ. Among customs which have become traditional are the decoration of homes with Christmas trees, evergreens, and candles, and the hanging of stockings in readiness for the arrival of Santa Claus.

PREPARATIONS can be started in advance and if members of the family join in the making of attractive decorations, this will contribute to the feeling of pleasant expectation. With a little ingenuity inexpensive materials can be combined to give gay and colourful results. A pine-gathering expedition is very rewarding and cones of all shapes and sizes can be used to advantage. Trespassing and ruthless vandalism of trees are not to be encouraged, but there is ample scope for obtaining the necessary materials from legitimate sources. Many of the decorations described here can be completed beforehand, and others can be prepared for the greenery to be added shortly before Christmas.

Decorating a Door

A gay decoration hanging from a door lends a festive air and reflects the hospitable spirit of Christmas. Sprays of magnolia leaves, cones, and 2yds. of red ribbon were used for the decoration illustrated on the opposite page. To make a similar decoration first make a frame by bending a wire coat-hanger or some fencing wire, or use an evergreen branch as a base. For extra shine and durability paint the magnolia leaves with clear varnish and allow them to dry. Use white paint to high light the tips of the cones. Fasten the sprays of leaves and the cones to the base with florists' wire. Make bows with the ribbon and arrange them in position.

▲ The wall plaque.

A Wall Plaque

Another use for a circular pulp wallboard or cake board is to form a base for an attractive wall decoration. Paint the board with silver paint and try out an arrangement of magnolia leave sprays and yew or spruce clippings. Mark four points on the board in the position where florist's wire can be inserted to hold the greenery in position. Pierce holes through the board and insert the wire. Place the leaves back in position and pull the ends of the wire through to the back of the board. Fasten the leaves firmly and twist the ends of the wire into a loop for hanging the plaque to the wall. Make a large bow of red ribbon and wire this and a group of silvered cones into position.

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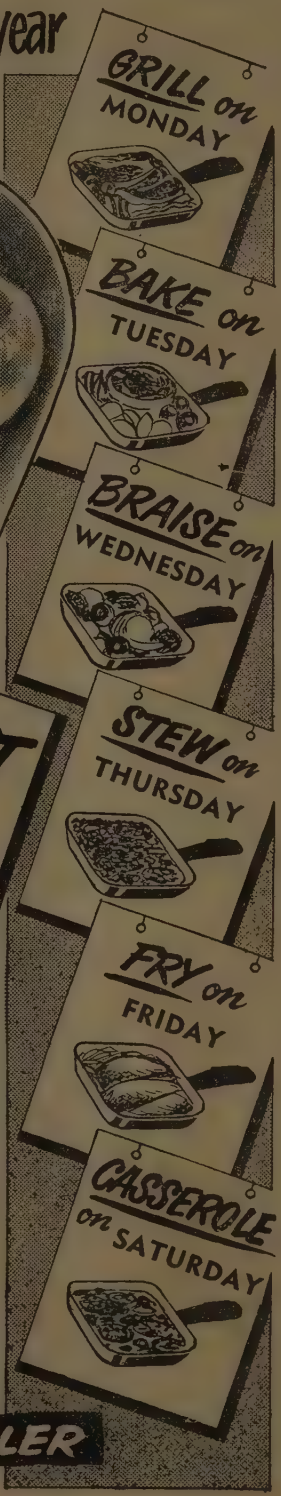


The Advent Wreath

The advent wreath symbolises the coming of Christ and is patterned after the ceramic wreaths of the 15th century sculptors Luca and Andrea della Robbia. It can be used either to brighten a hallway or to decorate a door.

For the base use a florist's wreath of sphagnum moss. Make small wire staples of heavy florist's wire and use these to fasten the sprays of retinospora or other greenery into the base. To support the candles twist lighter wire into spirals and push the free ends into the wreath. To complete the decoration use holly leaves painted silver and either real or artificial berries.

The Christmas Candle

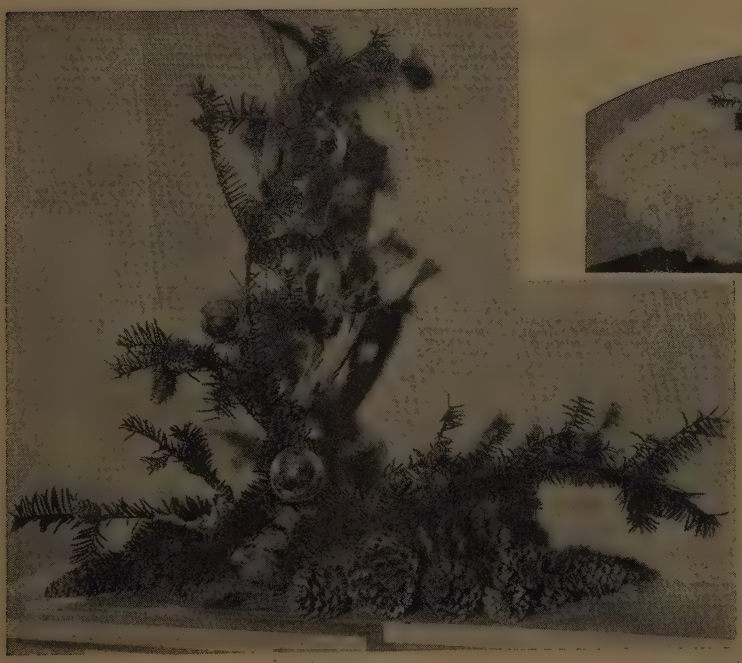
For tables or mantelpieces effective decorations can be made. A wooden base painted green and covered with chicken netting is required, and for a large table or mantelpiece the base should be 13½in. long by 6½in. wide.

Cut a hole in the netting large enough to insert the candle; then staple the netting to the board, leaving it slightly raised so that the greenery can be pushed through it. Make a candle 15in. high by rolling corrugated cardboard into a firm roll with the corrugations inward and fasten the edge with glue. Paint the candle with two coats of red lacquer paint. Cut a flame shape from cardboard and paint it yellow with a red centre. Attach the candle to the board with plastic modelling material.

← The advent wreath.

The Christmas candle. →

Tuck sprays of yew or other suitable greenery into the chicken netting and secure the ends in the plastic material which supports the candle. Paint the cone tips white and while the paint is still wet dip the ends in glitter. Attach these to the netting with florist's wire. Finally, add a gay bow and lightly streak the yew sprays with white poster paint to resemble snow.



A decoration made from driftwood, which has many possibilities as a base for mantel decorations. It is essential that the driftwood should have a firm base and that it should be in proportion to its setting.

Driftwood Decoration

Driftwood has many possibilities as a base for a mantel decoration and the arrangement can vary according to the shape of the driftwood. The essentials are that the driftwood should have a firm base and that it is in proportion to its setting.

To make a decoration such as that shown at left use a few sprays of yew with some small silver-painted cones attached, three silver balls, and one or two other little pieces such as

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(2) Special sealant under tread seals round intruding nails . . . permanently blocks the hole when nail is removed. Most tubeless tyres are puncture-*resistant* (while nail is left in). LIFE-SAVERS are puncture-*sealing* (nail in or out).

(3) "Centipede" tread has over 10,000 skid-defying "grip-blocks" to hold your car on wet, icy or greasy roads. Because you are only as safe as your tyres, fit—

LW — 4

Reidrubber

LIFE-SAVER

Made to the specifications of B. F. Goodrich — original inventors of Tubeless Tyres.

▲ Two table decorations.

little birds. Then arrange other cones, which have been painted and dipped in glitter, along the mantelpiece to balance the composition.

Table Decorations

A dark-stained table or a red or green cloth will make a lovely setting for the green and silver centrepiece described here. Use a cake board or a circular piece of pulp wallboard 12in. in diameter for the base. Paint the base, holly leaves, and cones with silver paint and allow them to dry. Mould a thick ring of plastic modelling material into a shape to hold the candle and press it firmly to the centre of the board. Fasten some sprays of feathery, green foliage such as retinospora into the plastic material; then add the holly and finally the cones. The full effect will be obtained when the candle is lit and the silvered leaves are set a-sparkling.

Another effective centrepiece for a table can be made with trails of ivy, tall, slim candles, and coloured glass balls. For the base use a round wooden tray, a floating bowl, or other shallow container. Make a ring of plastic modelling material, attach it to the tray, and space the candles evenly round in the plastic material. Add the trails of ivy and finally pile in the coloured balls.

Bird in a Cage

The birdcage illustrated at right is made from 18 pipe cleaners, 21 drinking straws, and some raffia. For the floor of the cage cut straws into 6 pieces each 3½in. long. Lay them across each other in the form of a pin wheel and weave raffia around the spokes as shown in the left inset in the illustration.

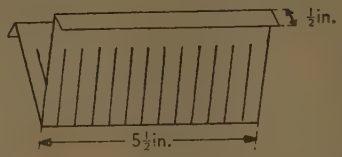
For the sides push pipe cleaners into the bottom of 9 full-length straws. Bend the ends of the cleaners as in the right inset in the illustration and work them into the raffia base. Push pipe cleaners into the top of each side straw, leaving ¾in. to hold the roof.

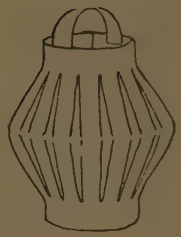
For the roof cut nine straws to 6in. long and fit them on to the bent ends of the cleaners as in the right inset in the illustration. Hold the straws in place so that they all cross each other at the top and tie them in place with raffia. Weave raffia round the roof in the same way as the floor, continuing to the joins.

The bird: A table tennis ball can be used for the body of the bird. Make two holes opposite each other on the ball and push a piece of wire through to support the head and tail. Shape the neck and head with cotton wool held firmly with white cotton. Glue a paper beak in place and make wings, comb, tail, and legs out of coloured paper and

▼ The bird in a cage, showing (insets) the method of making the floor, sides, and roof. For instructions see text at left.

The Christmas tree. Instructions for the decorations are given on this and the opposite pages.





The Chinese lantern.

glue these in place. Use bright sequins for eyes.

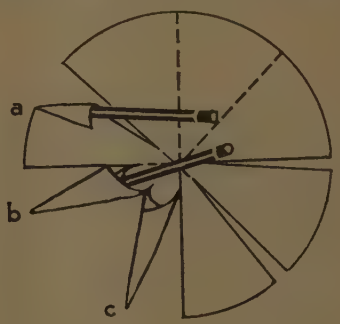
Tree Decorations

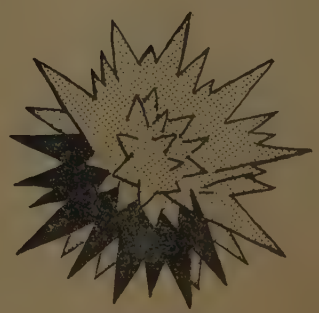
The small Christmas tree illustrated at left is ideal for a corner of a room. With the exception of the tinsel star on the top of the tree all the decorations were home-made.

Chinese Lantern

The Chinese lantern near the top of the tree can be easily made by folding a strip of coloured paper in half, the size depending on the size of lantern required. The one illustrated was made from a strip 4½in. by 5½in.

If the paper is coloured on both sides, fold down ½in. to the outside (see diagram above), but if it is coloured on one side only, fold this piece to the inside. Make vertical cuts from the folded edge to about ¾in. from the top. Open out the paper and join the ends to form a ring. Paste a strip of paper at the top for a handle.





The porcupine.

The Porcupine

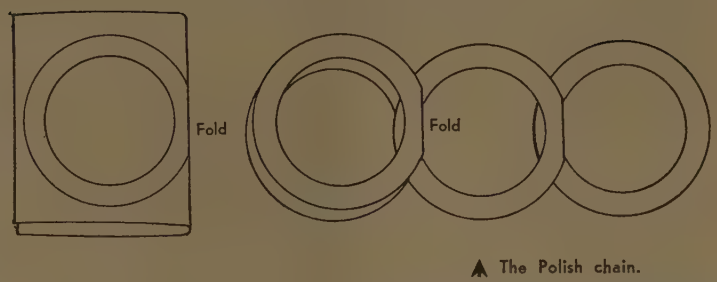
The porcupine, which originated in Poland, is simple to make, though it is a very effective and professional-looking decoration. The one shown in the centre of the small tree was made from aluminium foil, but any coloured paper could be used.

Cut ten identical circles of any size required. The upper diagram at the bottom of the opposite page shows the beginnings of a porcupine cut from a circle 4in. in diameter. Divide each circle into eight parts by folding it three times. Cut on each fold line to about ½in. from the centre. Roll each wedge round the point of a pencil to form a cone. Start at one outside point as shown at a in the diagram and roll toward the centre. Then bring the other point over and roll round the pencil as at b. Secure the loose end with glue or a small piece of transparent sticking tape. A completed cone is shown at c.

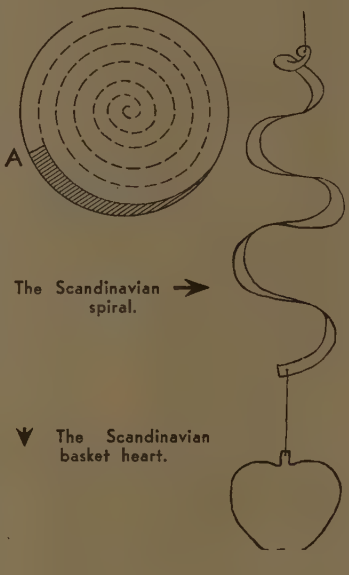
When the circles have all been completed thread a piece of cotton through the centres and pull them all together. Thread the cotton through a small piece of cardboard at each end for extra strength. Leave enough cotton at one end for hanging. A finished porcupine is shown in the lower diagram at the bottom of the opposite page.

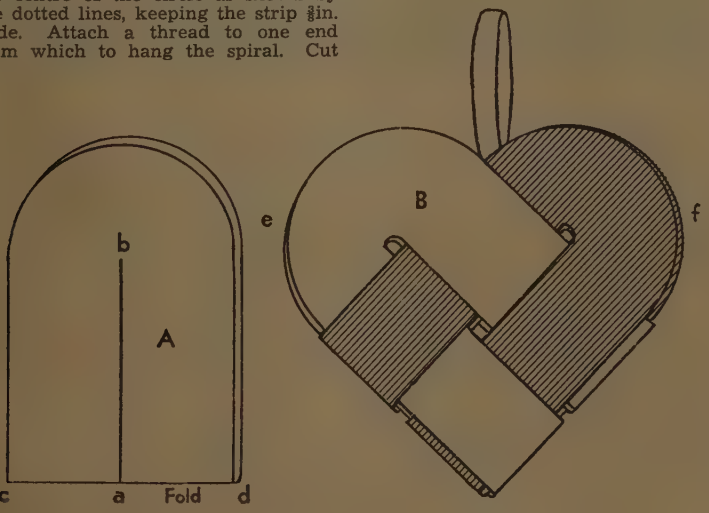
The Scandinavian Spiral

A spiral made from aluminium foil or light cardboard painted in gay colours gives an interesting effect of movement on the tree. Cut a circle about 3½in. to 4in. in diameter. Cut a piece off the circle as shown by the shaded section in the upper left figure in the diagram at right, cutting in ⅜in. at A. Cut a continuous strip to the centre of the circle as shown by the dotted lines, keeping the strip ⅜in. wide. Attach a thread to one end from which to hang the spiral. Cut



▲ The Polish chain.





out a paper shape, to represent a piece of fruit or an animal, and suspend this from the lower end.

The Polish Chain

The Polish chain seen at the bottom of the tree is made from a series of double circles cut from paper in various colours. To make a chain fold the paper double and describe circles about 2½in. in diameter as shown in the diagram above. Then draw inner circles about 1¾in. in diameter. Cut out the double circles, leaving the fold uncut. Open one pair of circles and loop it through the other. Continue with alternating colours until the chain is complete. The uncut folds hold the links of the chain together and no glue is required.

Scandinavian Basket Hearts

Make basket hearts with two different coloured papers. The heart is made up of two double sections as shown in diagram A at lower left. (A heart similar to that in the diagram is shown hanging near the bottom of the tree above the Polish chain.) Fold the paper double; then cut out each shape similar to that in diagram A. The line ab is the same length as cd. Cut up the line ab through the centre of each section. Join the sections to form the shape of a heart by weaving the strips of e and f together as shown in diagram B. Weave the top strip of e round the outsides of each layer of the top strip in f. Then push e between the two layers of the bottom strip of f. Weave the bottom strips in the opposite way. Paste a handle at the top of the heart.

Painted Cones

Small pine cones with the tips painted white make very attractive and useful additions to the tree. While the paint is still wet the tips can be dipped in glitter to give extra glisten. Attach the cones to the tree with florist's wire.

Painted Walnuts

Choose large walnuts and paint them with bright colours. Silver and gold show up the best. Pierce a hole in the top of each and push the ends of coloured wrapping tape into this and glue the nuts into position.

Easily Made Sunfrock and Hat for Child

By CHRISTINE LYONS,
Home Science Extension Officer,
Department of Agriculture,
Auckland

BOTH the sunfrock and matching hat in the outfit illustrated at right are very easily made and very easily looked after. The sunfrock is in one piece with a back opening and is therefore no trouble to iron. Though the hat is kept rigid with heavy-weight stiffening, it can be opened out flat for packing or storing.

THE measurements given are for a 2- to 3-year-old child, but the frock can be lengthened or shortened as desired.

The materials required are: 1yd. of cotton material, ¼yd. of contrasting cotton material (for hat lining), ¼yd. of heavy-weight stiffening, 2yds. of ric-rac braid, 6 buttons, 1 dome fastener, 1 reel of matching cotton, 1¼yds. of ribbon.

Instructions for Sewing

Sunfrock

Place pattern on fold of material and cut out. Use spare material for shoulder straps and for 1¼in.-wide strips of material cut on the cross (bias strips).

Face top edge with bias strips and turn in back openings, making turnings sufficiently large to allow for buttons and buttonholes. Sew on buttons and make buttonholes. Attach straps to front of frock; if desired, straps can be tied halter-neck fashion or buttoned on to the back waist of the frock.

Turn hem to desired length and finally sew on ric-rac braid.

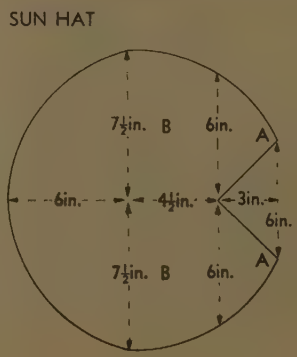
Sun Hat

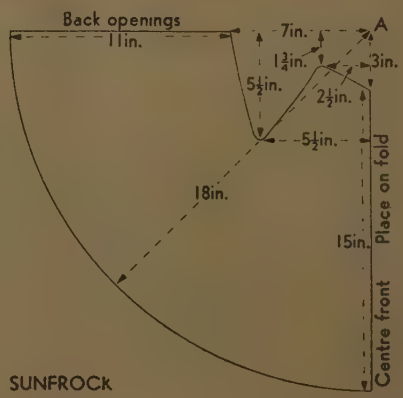
Cut three patterns, one from the cotton material, one from the contrasting lining material, and one from the stiffening. Mark points A and B with tailor's tacks (marking threads).

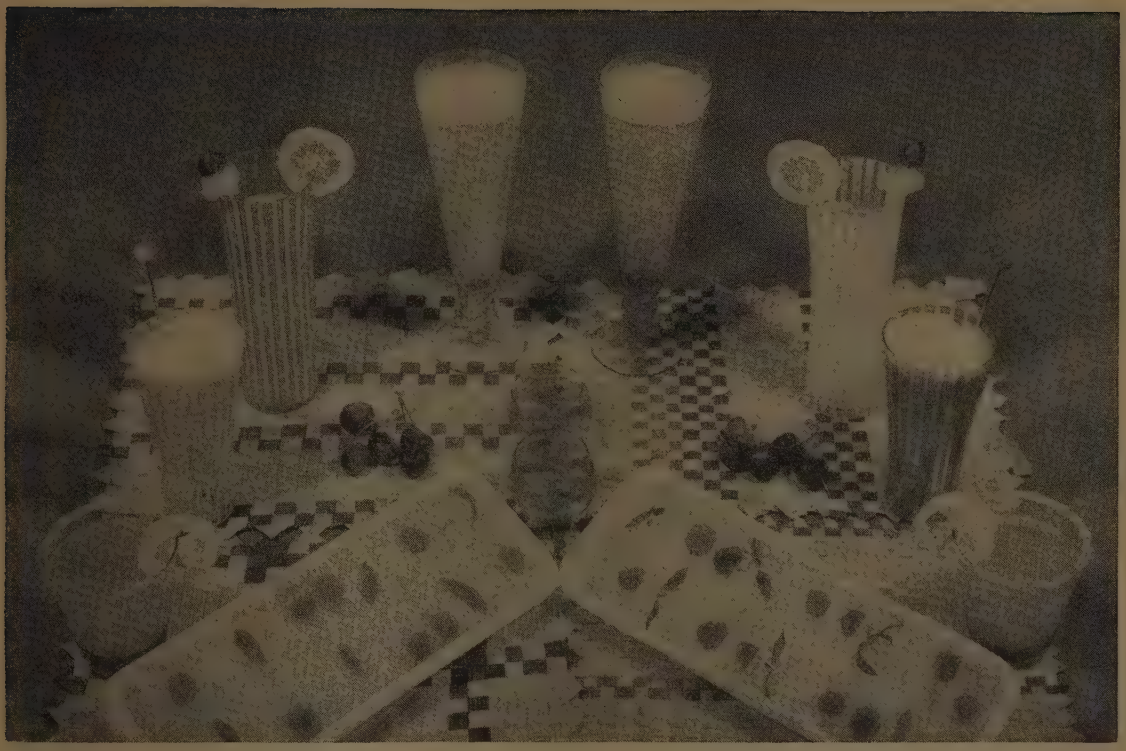
Place the three pattern pieces together; the right side of the cotton material must face the right side of the contrasting lining and the stiffening is placed on top of these two. The hat is sewn on the wrong side and then turned right side out. Tack all the way round ¼in. from the edge, then machine stitch this, but leave a gap sufficiently large to allow for turning right side out. When turned slip stitch the space together.

Attach strong dome fastener at points A so that edges overlap when done up. Make buttonholes at points B and thread the ribbon through these so that the hat may be tied under the chin.

[*Sparrow*







Cool and Refreshing Drinks for Summer

By CHRISTINE LYONS,
Home Science Extension Officer, Department of Agriculture, Auckland

THE words, "I'm so hot and thirsty. What can I have to drink?" are heard a great deal during summer, and come from the older members as well as the younger members of the family. It is not always easy to keep pace with the heavy demand or to think of something different, but with a little forethought and with the aid of the refrigerator the problem is considerably easier to cope with. In this article drinks have been divided into basic types to include fruit drinks and punches, iced beverages, ice-cream sodas, and those with a milk base.

BECAUSE of their acid tang fruit drinks are most refreshing and at the same time helpful to appetites which are apt to need more encouragement during the hot weather. They are also excellent accompaniments for the school lunch bags. If fruit is in large supply at certain times of the year, a wise plan is to bottle fruit juice or to make fruit syrup, especially from such fruits as grapefruit, lemons, black currants, raspberries, blackberries, and grapes.

Lemon Syrup to Bottle

1 large lemon	½oz. of citric acid
2lb. of sugar	1½ pints of water

Peel the lemon very thinly, put the rind into a pan with the water, and simmer for 15 minutes. Squeeze the juice from the lemon, strain, and add it to the rind and water. Simmer a further 15 minutes, remove the rind, add the sugar and citric acid, and boil gently for 5 minutes. Cool and then bottle. Dilute as desired. This keeps well.

Orange Syrup

6 oranges	¾oz. of citric acid
3lb. of sugar	2½ pints of water

Simmer the rind of 3 oranges with the water for 15 minutes, squeeze the juice of the 6 oranges and add to the rind and water. Simmer a further 15 minutes, then remove the rind, add the sugar and citric acid, and boil gently for 5 minutes. Cool and bottle. Dilute as desired.

Blackberry Syrup

Ripe blackberries Sugar and water

Mash the fruit to extract the juice and leave to stand overnight. Measure the juice obtained and to each pint add the following syrup:—

1½lb. of sugar ¾ pint of water

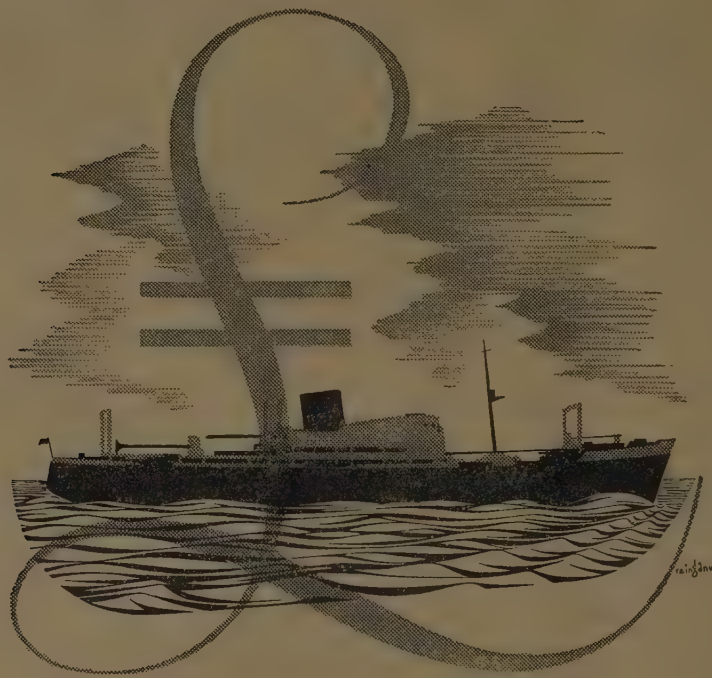
Bring to the boil and simmer for 10 minutes. Bring the juice and the syrup back to the boiling point, remove from heat, strain the liquid, bottle, and cork tightly. Dilute as required.

Grape Syrup

4lb. of dark grapes Sugar

Wash and stem the grapes. Cover with water and boil slowly over low heat until the juice is extracted (approximately 2 hours). Put in a jelly bag and strain overnight. Do not squeeze the bag. Measure the juice and to each quart add 1lb. of sugar. Bring this to the boil and simmer for ½ hour. Bottle and cork tightly. When diluting use 1 part of juice to 3 parts of water.

HEADING PHOTOGRAPH: A selection of summer drinks with various garnishes. Attractive extras like these go a long way toward making the drinks even more acceptable.



What happens to every pound we earn

Everybody knows that money needs managing. That's why most of us are interested to hear how other people manage theirs. But, whether you're dealing with hundreds of pounds or with millions, the problems are basically the same; it all comes down to shillings and pence in the end.

Shipping finance is no exception. This is what happens to every £ we earn in the way of freight and passage money.*

We spend on Fuel		1s. 11d.
Port Charges come to		1s. 6d.
Insurance of ships, crews and cargoes cost		10d.
Food, provisions and stores come to		1s. 3½d.
Labour and services—which includes, not only wages for the crew, but the costs of cargo handling, ship repairs and general maintenance		11s. 3½d.
The original pound has already been reduced to 3s. 2d.—and only the actual operating expenses have been paid so far. We can however at this point take in a small item for miscellaneous income (from investments and so on). The amount is 7d. That gives us 3s. 9d. in hand—but not for long.		
To recover the original cost of our ships we set aside as Depreciation the sum of	2s. 0½d.	
... *but* costs of replacement continue to rise steeply and to make some provision for this we put aside an additional	6d.	2s. 6½d.
Taxation takes		11½d.
To the Shareholders we pay a dividend of		3d.
... *and that's it.*		

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*(*Figures quoted from the accounts of one of the New Zealand Overseas Lines over the six-year period ending September 1956*)

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Fruit Syrup

(Suitable for raspberries, strawberries, or currants)

2lb. of fruit — 2lb. of sugar

Wash the fruit, mash in a basin, and leave to stand for 24 hours. Strain the juice through muslin and put into a pan with sugar. Bring to the boil slowly, remove from the heat, and cool. Bottle and cork tightly. Dilute as required.

Raspberry Cordial

1 quart of wine vinegar — 4 quarts of raspberries
1½lb. of sugar

Pour the vinegar over 2 quarts of raspberries and mash with a wooden spoon. Cover and leave for 48 hours. Strain off the liquid on to the remaining 2 quarts of raspberries and leave for 48 hours. Mash well and strain again. Add the sugar, stir, and simmer over low heat for about ½ hour until the sugar is quite dissolved. Strain and bottle. Cork tightly and keep for 6 weeks before use. This is a very refreshing drink, especially if it is diluted with ice and soda water.

Bottled Grapefruit Juice

Choose fresh, juicy, New Zealand grapefruit. Squeeze out the juice, strain, and place in a pan. If desired, add sugar at approximately ¼lb. to ½lb. for each pint of juice, depending on personal taste. Heat to boiling point or until sugar is dissolved. Pour while still boiling hot into warm, sterilised bottles and cork immediately. The juice can be diluted if desired, but if bottled without sugar, it can be used as pure grapefruit juice.

These fruit drinks will all keep at least 3 months. When ready for use they can be diluted with iced water, soda water, or ice cubes.

Ginger Beer

1½oz. root ginger (crushed) — 1 tablespoon of compressed yeast
1lb. of white sugar — 1 gallon of boiling water
1oz. of cream of tartar — 1 lemon (if desired)

Put ginger, sugar, and cream of tartar in a wide-necked earthenware jar and pour the boiling water over them. If desired, slices of lemon may be added to the mixture. Leave to cool and then add the yeast (well crumbled). Cover with a blanket and let stand until next morning. Strain the liquid through a muslin bag or a fine sieve. Bottle and fasten corks securely with string. Store in a cool place for 5 to 7 days, when it will be ready for use.

Fresh Fruit Drinks

As sugar syrup dissolves much more readily than sugar, it is handy to keep a bottle ready made. It can be placed in the refrigerator or in the cool part of a safe.

Sugar Syrup

4 cups of sugar — 4 cups of water

Put the sugar and water in a pan. Bring to boiling point and then leave to simmer without stirring for 7 minutes. Cool and bottle. This makes 4 cups of syrup.

Pineapple Drink

Take ½ cup of pineapple juice and mix with it 1 tablespoon of lemon juice and sugar syrup to taste. Stir well. Divide equally between 4 glasses and fill with soda water or lemonade. Top with ice-cream or whipped cream flavoured with small pieces of chopped pineapple.

Ginger Appleade

For each serving allow 2 to 3 tablespoons of sweetened apple juice. Put in tumblers and fill with ginger ale. Add a chunk of ice, a sprig of fresh mint, and a piece of lemon. Serve very cold.

Strawberry Lemonade

For each serving allow:—

Juice of ¼ lemon — 2 tablespoons of strawberry syrup
1 tablespoon of sugar syrup — Soda water
Ice chips

Put the lemon juice, sugar syrup, and strawberry syrup in a tumbler, add the ice, fill with soda water, and stir well. For garnish, use a fresh strawberry if available.

Fruit Nog

1 egg — Juice of 1 orange
1 teaspoon of sugar — Juice of 1 lemon
Ice chips

(2 servings)

Beat the egg and sugar until they are very pale and thick. Add chilled, strained fruit juice, stirring all the time. Put ice in the glasses and pour the egg and juice mixture over this. Serve immediately.

Black currant or grapefruit juice is a suitable replacement for the orange and lemon juice.

Lemonade Base 1

2 cups of sugar — 6 lemons
1 cup of fresh mint leaves — 2½ cups of water
2 oranges

Fruit punch served in a punch bowl with slices of fruit and ice cubes makes an attractive centre piece for a party.

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Combine the sugar and the water and heat for 5 minutes. Cool slightly, then pour over the mint leaves. Add the rind of 1 orange together with the juice of the 2 oranges and 6 lemons. Cover and leave to stand for 1 hour. Strain into glass containers and leave in a refrigerator or in a cool place until ready for use. Allow ½ cup of this lemonade base for each glass and fill with ice cubes and cold water.

Lemonade Base 2

3lb. of sugar
½oz. of tartaric acid
3 pints of boiling water
½oz. of citric acid
½oz. of Epsom-salt
3 lemons

Put the sugar, citric acid, tartaric acid, Epsom-salt, rind of 1 lemon, and juice of 3 lemons into a pan. Add the boiling water and stir until dissolved. Strain into bottles. This will keep 3 to 4 weeks and is a very concentrated base. Use approximately a sixth of a glass for each serving and dilute with ice cubes and cold water.

Lemonade Base 3

3 lemons
¼ to ½ cup of sugar
3 pints of boiling water

Boil the sugar and water until the sugar is dissolved. Add the lemon juice. Dilute with any of the following:—

2 cups of ginger ale
2 cups of pineapple juice or syrup
2 cups of prune juice
2 cups of apricot or peach juice
2 cups of loganberry or raspberry juice

Serve this very cold. Cubes of iced tea are a very good addition to any of these.

Black Currant Drink

1½lb. of black currants
½lb. of sugar
Juice of 2 lemons
1 pint of boiling water
Thin slices of lemon

Cook the black currants slowly with the sugar, but keep aside 1 tablespoon of the berries. Mash well, strain, and measure the juice, adding, if necessary, water to make up to 1 pint. Add the boiling water and the strained lemon juice, cool, then chill. When serving add the tablespoon of black currants and some thin slices of lemon.

Tomato Juice

2lb. of tomatoes
¼ teaspoon of lemon rind (grated)
½ clove of garlic (optional)
½ teaspoon of salt
1 large onion (chopped)
½ teaspoon of mixed herbs
2 teaspoons of sugar
⅛ teaspoon of pepper

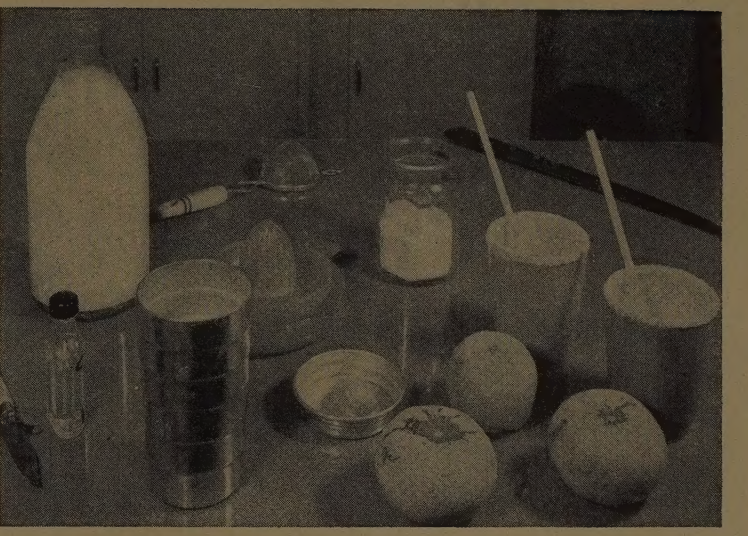
Cut up the tomatoes and put in a pan. Cover with water, and add the chopped onion, lemon rind, herbs, garlic, sugar, salt, and pepper. Bring to the boil and keep at simmering point for about an hour. Strain through a fine sieve. Cool and serve as cold as possible with slices of lemon or a small sprig of mint.

Grapefruit Reviver

1 teaspoon of dried yeast
1 teaspoon of honey
¼ cup of lukewarm water
¼ cup of grapefruit or orange juice

(1 serving)

Mix the yeast, honey, and water in a glass. Leave to stand overnight.



Ingredients and utensils for an orange milk shake.

When ready for use stir and add the fruit juice.

Fruit Punches

Fruit punches are excellent for summer parties. They can be fortified if desired with rum, brandy, or gin, but they must have a good fruit base. Served in an attractive punch bowl with slices of fruit or ice cubes, a fruit punch can make a very attractive centre piece for a party table.

Pineapple Punch

2 cups of strong tea (double strength)
¾ cup of lemon juice
1 cup of sugar
8 pineapple slices (chopped)
4 pints of soda water
Pulp of 6 to 12 passion fruit (optional)
1 dozen small mint sprigs
1½ cups of orange juice
4 pints of ginger ale
Ice cubes

(Approximately 20 servings)

Make the tea, strain, and heat with the fruit juices and the sugar until the sugar is dissolved. Add the mint and leave to cool for 2 to 3 hours. Shortly before serving add the pineapple, chilled ginger ale, soda water, ice cubes, and passion fruit pulp if used.

Spiced Cup

¼ pint of pineapple juice
½ pint of water
1½oz. of sugar
4 cloves
¼ teaspoon of cinnamon
2 pints of ginger ale or soda water
½ pint of orange juice
1 lemon
1 tablespoon of honey
¼ teaspoon of grated nutmeg
⅛ teaspoon of mixed spice
Mint, slices of raw apple, or pineapple pieces to garnish

(Approximately 10 servings)

Add the pineapple and orange juices to the water, add the grated rind and juice of the lemon, sugar, honey, and spices. Stand for 12 hours, strain, and add the ginger ale or soda water and the garnishes.

Iced Beverages

Tea

Iced tea had its origin in the United States of America and is not yet widely used in New Zealand. It is made in the same way as hot tea, but is twice as strong. The double strength allows for the dilution by the ice without loss of flavour. Use 4 teaspoons of tea for 2 cups of boiling water. Strain into glasses a third full of crushed ice. Sweeten to taste with sugar or sugar syrup and put into each glass a slice of lemon or a sprig of mint. Chilling immediately after brewing retains the flavour. It must be served very cold.

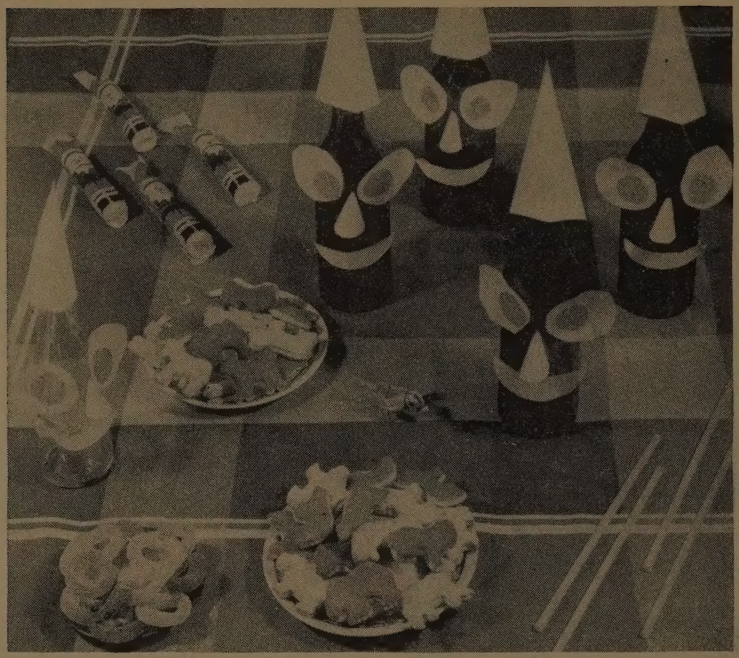
Iced Tea Cubes

3 cups of boiling water
2 teaspoons of sugar
3 tablespoons of tea leaves
¼ cup of lemon juice

Make the tea with the boiling water and tea leaves. Leave to stand for 3 minutes, add the sugar and the lemon juice. Strain into the freezing tray and freeze. These have a variety of uses; for example, they can be added to iced tea, to fruit drinks, to ginger ale, or to fruit punches.

Coffee

Iced coffee also had its origin in the United States of America and is rather an acquired taste. The coffee for chilling must be of double strength; otherwise the flavour will be insipid.



A simple, yet novel effect for a children's party. Used bottles are filled with a fruit drink and then decorated as illustrated above. The only materials needed are white paper and glue.

Iced Coffee 1 (unsweetened)

2 tablespoons of coffee
1 measuring cup of boiling water

Pour the boiling water over the coffee and leave to stand in a warm place for at least 7 minutes. Strain. A percolator can be used if it is available. Chill the coffee well and then mix with a little top milk or very thin cream. Keep in a refrigerator until ready for use. Pour into glasses and top with some whipped cream.

Iced Coffee 2 (sweetened)

Clear, strong coffee (as above)
Sugar syrup
Whipped cream
Ice

Pour the freshly made coffee into glasses containing small lumps of ice. Sweeten to taste with syrup. Leave to chill, then when ready for use top with a spoonful of whipped cream. For a change try flavouring the whipped cream with one of the following: Cinnamon or nutmeg, a few drops of peppermint essence, a little grated orange rind, or some grated chocolate. A spoonful of ice-cream can take the place of the whipped cream and sugar syrup.

Milk Drinks

Quite a number of children do not like milk, but when it is disguised in the form of a milk shake it is likely to meet with greater approval. If possible, chill the milk before using.

Banana Milk Shake

2 cups of cold milk
1 teaspoon of sugar
1 medium-sized banana (mashed)

(2 servings)

Place all in a shaker and mix well. Pour into a tall glass and sprinkle nutmeg on top.

Orange Milk Shake

1 cup of cold milk
½ cup of orange juice
2 drops of almond essence

(2 servings)

Place in a shaker and shake until frothy. Pour into glasses. Top with a spoonful of ice-cream.

Chocolate Milk Shake

½ pint of milk
2 tablespoons of crushed ice
2 tablespoons of drinking chocolate powder or a serving of chocolate ice-cream

Shake well. Pour into glasses and sprinkle with grated nutmeg.

Prune Delight

1 cup of cold milk
½ teaspoon of lemon juice
½ cup of prune juice
Syrup to sweeten (if necessary)

(2 servings)

Shake well.

Pineapple Special

1 cup of cold milk
½ cup of pineapple juice

(2 servings)

Shake until frothy.

Strawberry Milk Shake

½ pint of vanilla ice-cream
1 pint of milk
½ pint of strawberry ice-cream

(4 to 6 servings)

Beat with a rotary beater or electric mixer until well blended. Pour into glasses and top with a whole strawberry.

The addition of 1 dessertspoon of skimmed milk powder will increase the food value and give a frothier milk shake. If the skimmed milk powder is used, it should be added last and should be well blended to ensure a smooth mixture. Ice-cream can be added to any milk shake if desired.

Ice-cream Sodas

Ice-cream sodas can be made very easily from fruit syrups or from the syrup left over from tinned fruit. Put 3 to 4 tablespoons of fruit syrup in a glass (depending on the strength of the syrup and the size of the glass), add a scoop of ice-cream and pour sparkling lemonade or soda water over this. Stir briskly and serve immediately. If fruit is available, top with raspberries, strawberries, or cherries.

Attractive Extras

As with all food preparation, the finishing touches go a long way toward making the drinks even more acceptable.

For a real party effect dip the rims of the glasses first in fruit juice and then in sugar. Chill. This gives a crusty edge.

Thin slices of lemon can be used to decorate glasses. Cut to the centre of the lemon on one side and place on the edge of the glass.

Cubes of pineapple topped with a cherry and placed on a straw also look very attractive.

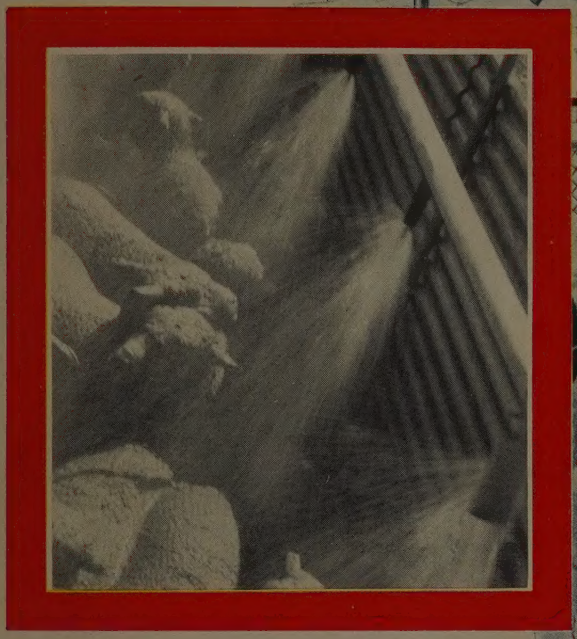
Decorative Ice Cubes to Add to Drinks

Fill refrigerator trays with fresh water, plain, coloured, or fruit flavoured. Place in each section of the tray a maraschino cherry, a small ripe strawberry, a raspberry, a cube of pineapple, a tiny sprig of young mint (mint incidentally gives any fruit drink a very pleasant flavour), 1 or 2 pieces of chopped apricot, or a wedge of orange or lemon (this is very good for iced tea).

If only a few cubes are needed from the ice tray, the remaining ones can be put into a plastic bag and returned to the freezing section of the refrigerator immediately. In this way they will not stick together and can be kept until required. If there is to be a party where a large number of ice cubes will be needed, several trays can be made beforehand and kept, thus ensuring that the unfortunate latecomers will not be greeted with tepid drinks.

All photographs by Sparrow.

Printed by Blundell Bros. Ltd. (The Evening Post), Wellington—6130



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FASTEST METHOD OF TIP SPRAYING

If you choose to dip OFF SHEARS or wish to control fly strike it is a simple matter to convert your STEWART Sheepshower to the fastest known method of Tip Spraying by fitting special Fine Spray Nozzles which are available for this purpose.

Yes! The STEWART SHEEPSHOWER is the most versatile equipment on the market! You can be sure of a STEWART Sheepshower, already *THE CHOICE OF 20,000 NEW ZEALAND AND AUSTRALIAN FARMERS.* Unceasing research by STEWART technicians is your guarantee that STEWART is foremost in the field.

AVAILABLE AT ALL BRANCHES OF THE SOLE NEW ZEALAND DISTRIBUTORS

WRIGHT STEPHENSON & CO. LTD.

The Harvesting is behind you . . .
the pleasure is ahead . . .
when IH TAKES THE FIELD

INTERNATIONAL HARVESTER IMPLEMENTS take the work and the time out of harvesting . . . you get the job completed more quickly, more efficiently. You'll agree that it's a pleasure to work with such good equipment . . . and you'll be agreeably surprised at the time you save . . . time you can take out for more pleasurable pursuits. There's a day coming when you'll take I.H. IMPLEMENTS to your fields.

B-23
3 POINT MOUNTED MOWER

Z-PB 2 SIDE-RAKE AND TEDDER

B-3-R
BALE LOADER

B.250 DIESEL TRACTOR AND
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OPERATED HAY BALER

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